A Dissertation on

A DESCRIPTIVE STUDY OF VARIOUS USES OF COBLATION IN PHARYNGOLARYNGOLOGY

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DECLARATION

I, **Dr. KARTHIK.M**, solemnly declare that the dissertation, titled **"A Descriptive study of various uses of coblation in pharyngolaryngology "** is a bonafide work done by me during the period of February 2013 to September 2014 at Government Stanley Medical College and Hospital, Chennai under the expert supervision of **Prof. Dr. N.SEETHALAKSHMI, M.S., D.L.O., D.N.B,** Department Of Otorhinolaryngology , Government Stanley Medical College and hospitals, Chennai.

This dissertation is submitted to The Tamil Nadu Dr. M.G.R. Medical University in partial fulfilment of the rules and regulations for the M.S. degree examinations in Otorhinolaryngology to be held in April 2015.

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CERTIFICATE

This is to certify that the dissertation - **"A DESCRIPTIVE STUDY OF VARIOUS USES OF COBLATION IN PHARYNGOLARYNGOLOGY "** presented by **DR. KARTHIK.M**, is an original work done in the Department of Otorhinolaryngology, Government Stanley Medical College and Hospital, Chennai in partial fulfilment of regulations of the Tamil Nadu Dr. M.G.R. Medical University for the award of degree of M.S. (Otorhinolaryngology) Branch IV, under my supervision during the academic period 2012-2015.

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ABSTRACT

ABSTRACT

Coblation is controlled and non-heat driven process that uses bipolar radiofrequency to energise the particles in the conductive medium, such as saline, to form a precisely focused plasma field.

Aim:

To study the various uses and safety of Coblator in Pharyngolaryngology .

Methods:

The study was conducted in the Department of Otorhinolaryngology of Government Stanley hospital during the period Feb 2013 to Sept 2014.

About 65 cases which were selected randomly, based on the inclusion and exclusion criteria, were sub divided based on the diagnosis.

Out of which 20 were Chronic Adenoid Hypertrophy, 20 were chronic Tonsillitis, 5 were mild Obstructive sleep apnea syndrome, 20 were Benign Laryngeal lesions underwent Coblation assisted surgeries respectively.

Results:

Coblation Assisted AdenoTonsillectomy ensures complete and safe removal of tissue, decreased post operative pain ,Early return to normal diet Coblation Assisted Uvulopalatoplasty ensures complete relief of symptoms, minimal injury to surrounding normal tissue, post operative pain, Early return to normal diet. About 3 out of 40 patients had post operative bleeding, following Coblation Assisted Adenotonsillectomy.

INTRODUCTION

INTRODUCTION

Coblation is controlled and non-heat driven process that uses bipolar radiofrequency to energise the particles in the conductive medium, such as saline, to form a precisely focused plasma field.

These energized particles in plasma field have sufficient energy to disintegrate molecular bonds, providing ablation of soft tissue, while preserving adjacent normal tissue at a relatively lower temperature.

Low temperature plasma excision between 40ºC to 70ºC whereas that of conventional diathermy greater than 100ºC .

The result is a safe, minimally invasive, and virtually painless technique that can dissect the tissues with minimal injury to the surrounding healthy tissue and without altering the structure .

Hence healing and recovery is faster compared to the conventional techniques.

AIMS AND OBJECTIVE

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AIM OF THE STUDY

To study the various uses and safety of Coblator in Pharyngolaryngology .

OBJECTIVE OF THE STUDY

1. To study the various uses, different operative techniques and safety of coblator .

2. To assess the primary outcome and secondary outcome in post coblator Adenoidectomy patients

3. To assess the primary outcome and secondary outcome in post coblator tonsillectomy patients

4. To assess the primary outcome and secondary outcome in coblation Assisted Uvulopalatopharyngoplasty

5. To assess the primary outcome and secondary outcome in coblator Assisted Excision of benign laryngeal lesions and Dennis Kashima's procedure.

6. To know the disadvantages of using coblation .

INCLUSION CRITERIA

1. Age 10 - 45 years

2. Patients diagnosed chronic Adenotonsillitis ,snoring , benign laryngeal lesions and Bilateral vocal cord paralysis.

EXCLUSION CRITERIA

1. Age <10 or >45years

2. Systemic infections

3. Patient suspected tonsillar malignancy or laryngeal malignancy

4. Patients with Bronchial asthma/pulmonary Tuberculosis/obesity

5. Patients with bleeding diathesis or on Anticoagulants

6. Immunocomprised patients .

REVIEW OF LITERATURE

REVIEW OF LITERAURE

ANATOMY OF PHARYNX AND LARYNX

PHARYNX

The pharynx is a funnel shaped fibromuscular tube extending from the base of skull to the level of the body of sixth cervical vertebra .

It is approximately 15cm in length , about 3.5 cm at the base and 1.5 cm at the level of cricopharynx .

The pharynx is divided into 3 parts

1. Nasopharynx

2.Oropharynx

3.Hypopharynx

The lower end of pharynx is continuous with the oesophagus. This junction at the cricopharyngeal sphincter is the narrowest point in the digestive tract .

Nasopharynx

Nasopharynx is a cuboidal space and extends from base of skull to the level of an imaginary line drawn at the level of hard palate .

Anteriorly it freely communicates with the nasal cavities through the choana separated by the posterior end of septum.

Posteriorly it is related to upper cervical vertebra C1 and C2, prevertebral muscles and fascia.

Superiorly, Roof is formed by the basi-sphenoid and basi-occiput limited by the pharyngeal tubercle posteriorly .

Inferiorly, it communicates with the Oropharynx through the nasopharyngeal isthmus.

The Lateral wall of the Nasopharynx contains the following structures -

1. **Eustachian tube opening**

Situated in the lateral wall on each side of the Nasopharynx 1.25cm posterior to the level of the inferior turbinate. The orifice

is bounded postero-superiorly by torus tubaris, an elevation produced by the cartilagenous part of the Eustachian tube.

Just posterior to this eminence is a recess called Fossa of Rosenmuller .

2. Adenoids (Luschka's Tonsils)

These are a sub -mucosal aggregation of lymphoid tissue at the junction of the roof and posterior wall of the Nasopharynx. They are composed of vertical ridges of lymphatic tissue separated by furrows .

The Adenoids are present from birth and increases in size with age, and undergoes spontaneous regression after the age of 12 years. Very rarely it can persists even after puberty.

The Adenoids are of maximum size at age of 5 years .

Blood supply of Adenoids

1. Ascending palatine branch of facial artery

2. Ascending pharyngeal branch of external carotid artery

3. Pharyngeal branch of the third part of maxillary artery.

Lymphatic drainage of adenoids

Upper jugular nodes, retropharyngeal nodes, parapharyngeal nodes.

3. **Tubal Tonsils** (Gerlach's Tonsils)

It is a collection of sub epithelial lymphoid tissue in relation to the torus tubaris and can be continuous with the adenoids.

4. **Passavant's ridge**

It is a mucosal elevation produced by the palatopharyngeus muscle at the level of the nasopharyngeal isthmus. It becomes prominent during the act of swallowing when the soft palate makes contact with it.

OROPHARYNX

It is space which is in communication with the oral cavity anteriorly, the nasopharynx superiorly and the hypopharynx inferiorly. Anatomically, it is the space between the level of hard palate and the hyoid bone.

Oropharynx communicates with the oral cavity through the oropharyngeal isthmus.

The boundaries of the isthmus are

Superiorly -the soft palate

Inferiorly - Base of the tongue

Laterally -the palatine tonsil and anterior pillar

Posteriorly - Body of C2 ,C3 vertebrae ,prevertebral fascia and muscles .

Palatine Tonsils

These are bilateral ovoid masses of lymphoid tissue lying in the mucous membrane of the lateral wall of the Oropharynx in the tonsillar fossae.

The Tonsillar fossa is triangular in shape .Anteriorly, It is formed by the anterior pillar enclosing palatoglossus muscle, posteriorly by the posterior pillar enclosed by the palatopharyngeus and base is formed by the tongue .

A fold of mucous membrane called the plica semilunaris connects the anterior and posterior pillars at the upper pole of the tonsil and another fold the plica triangularis connects anterior pillar to the anteroinferior part of the tonsil.

At birth, the tonsils are small in size during early childhood They enlarge and then regress in size by the age of 16 -18 years.

The medial surfaces of the tonsil show a number of crypts (15-20). The intratonsillar crypt, Crypta magna is the largest and lies near the upper pole . It represents remnant of the second pharyngeal pouch. Tonsillar bed consists of loose areolar tissue , Pharyngobasilar fascia, superior constrictor muscle ,para tonsillar veins and buccopharyngeal membrane. The glossopharyngeal nerve and styloid process if elongated may lie in relation to the tonsillar bed.

Internal carotid artery lies 2.5cm postero-lateral to the tonsil. The Medial surface of the tonsil is covered by stratified squamous epithelium .

Blood supply of the tonsil .

1. Tonsillar branch of the facial artery

2. Branch from the ascending pharyngeal artery

3. Descending palatine artery, a branch of the maxillary artery.

4. Ascending palatine branch of facial artery

5. Dorsalis linguae arteries .

All the arteries except the descending palatine branch enter the tonsil via the inferior pole where as the descending palatine branch enters through the upper pole.

Venous drainage - Veins from the tonsil pierce the lateral surface and the inferior pole. The paratonsillar vein emerges on the lateral surface ,pierces the superior constrictor muscle to end in the common facial vein and pharyngeal plexus of veins.

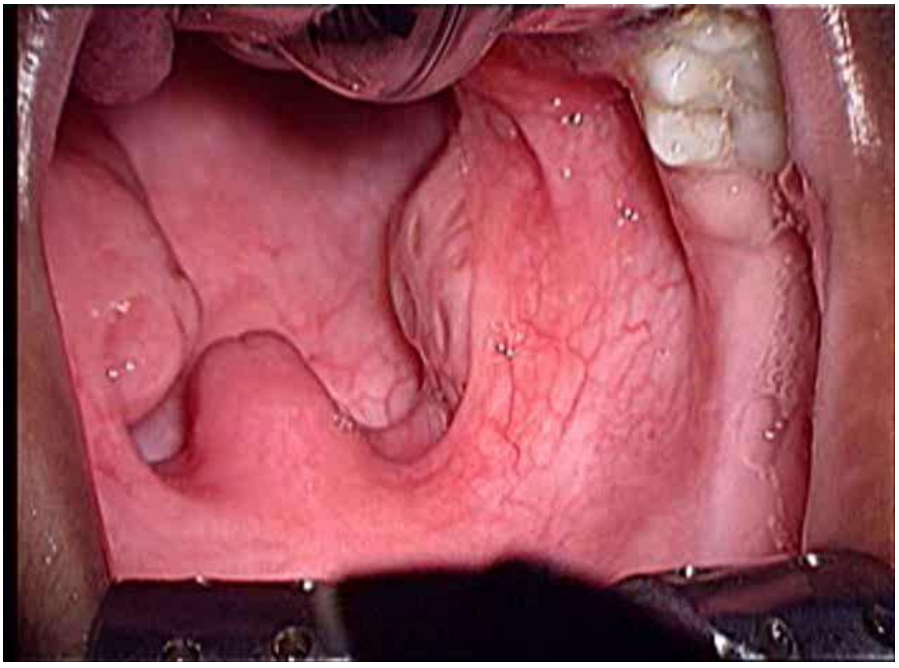


Fig -1 showing Oropharynx which contains Anterior pillar, both the Tonsils, Uvula, soft palate .

Hyopharynx (Laryngopharynx)

The lowest part of the pharyngeal tube which lies partly posterior and partly lateral in relationship to the larynx on either side.

It extends from level of the hyoid bone to the level of lower border of cricoid cartilage. It is related to the C4, C5, C6 cervical vertebrae.

It communicates with Oropharynx superiorly and continuous with the oesophagus at the level of the cricoids cartilage .

It is divided into three parts .

1.Pyriform fossa

2. Post cricoid region

3.Posterior pharyngeal wall

Pyriform sinus

It is a recess on either side of the larynx .It is an inverted pyramid like structure .It extends from the pharyngo-epiglottic

fold superiorly to its apex inferiorly related to the cervical oesophagus.

It is bounded by the Aryepiglottic fold medially and the thyrohyoid membrane and thyroid cartilage laterally .

Post Cricoid region

It extends from the level of arytenoid cartilage and connecting folds to the inferior border of cricoids cartilage ,thus forming the anterior wall of hypopharynx .

Posterior Pharyngeal wall

It extends from the level of the hyoid bone o the level of cricoarytenoid joint.

Layers of the pharyngeal wall

The pharyngeal wall is made up of four layers

Mucous membrane

Nasopharynx is lined by pseudostratified ciliated columnar epithelium .

Oropharynx and laryngopharynx is lined by stratified squamous epithelium.

Pharyngeal aponeurosis

It lies between the mucosal and muscular layers . It is thickened in the upper part and is called pharyngobasilar fascia.

Two Muscular layers

Outer layer consists of three constrictors namely superior, middle and Inferior constrictor .

Inner layer consists of three muscles namely stylopharyngeus, palatopharyngeus and salphingopharyngeus.

Nerve supply of pharynx

The pharyngeal plexus which supplies to the upper part of the pharynx including the surface of the tonsil and all the muscles of the Pharynx, except the stylopharyngeus which is supplied by the glossopharyngeal nerve.

Larynx

Embrology ;

The development of larynx begins from the hypopharynx with the fusion of lateral structures derived from the tracheobronchial primordium (arch 4 and 5) in the midline.

The larynx, trachea, bronchi and lungs have developed from the midline ventral respiratory diverticulum namely the laryngotracheobronchial groove .

Supraglottis develops from the Buccopharyngeal primordium (Arch 3 and 4).Glottis and subglottis develops from the Arches 4 and 6.

The laryngeal framework consists of muscles and their nerve supply overlying the architectural frame of bones , cartilages.

Framework of the larynx

The cartilages of the larynx are divided into three unpaired and three paired cartilages .The unpaired cartilages are thyroid ,cricoid, epiglottis .

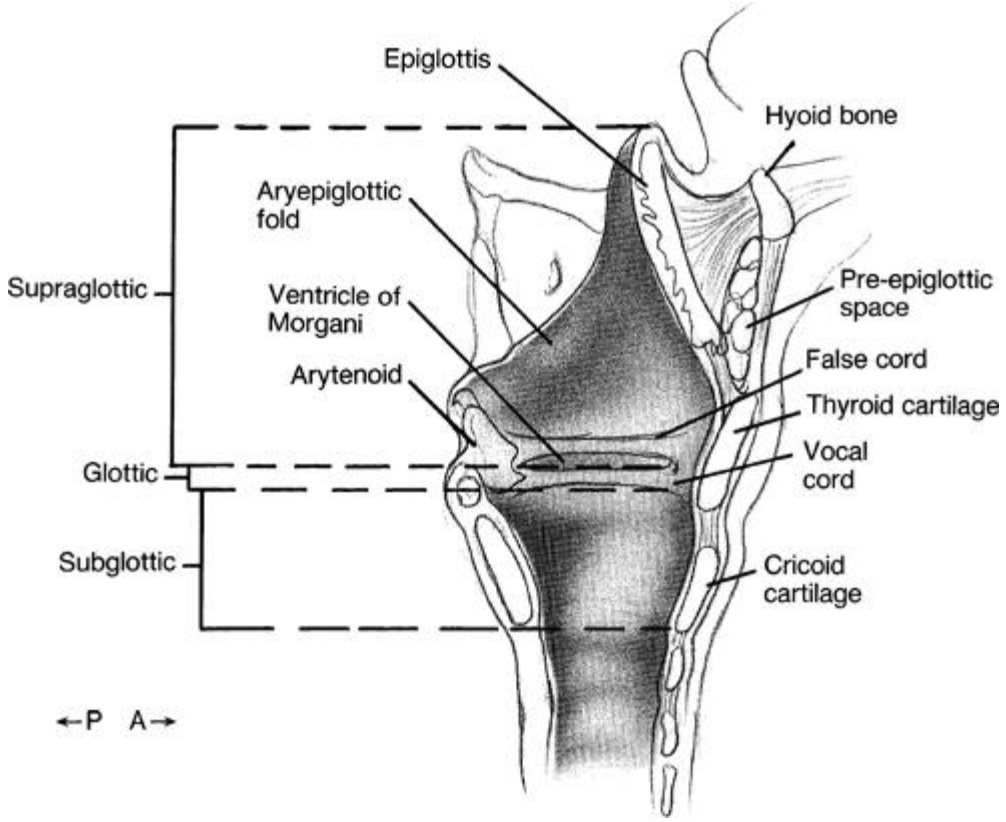


Fig:2 showing the Anatomy of Larynx – Supraglottis, Glottis and subglottis

TABLE : 1

	Thyroid	**Cricoid**	**Eiglottis**
Shape	Shield	Ring	Leaf
Parts	Two lamina joins at an angle of 90 degrees in males and 120Degrees in females .	Anterior narrower Arch and Posterior Broader Lamina	Mobile suprahyoid and Fixed infrahyoid parts
Muscles Attached	Sternothyroid, thyrohyoid, Inferior constrictor, thyroarytenoid	Inferior constrictor Cricothyroid and cricoarytenoid	Aryepiglotticus

Ligaments attached	Thyrohyoid membrane with false cord .	Cricohyoid membrane	Thyroepiglottic ligament
Functions	Protects the larynx	Laryngotracheal connection	Guards the laryngeal Inlet
Histology	Hyaline cartilage	Hyaline cartilage	Fibroelastic cartilage

Paired Cartilages :

The paired cartilages are arytenoids, corniculate and cunieform. The arytenoids form the posterior support for the laryngeal folds. It has two processes one pointing anteriorly attached to the vocal cord and forms posterior commisure of glottis and the pointing laterally called the muscular process giving attachments to the laryngeal muscles.

The arytenoids articulate with the lamina of the cricoids cartilage. The corniculate and cunieform cartilages articulate with the apex of the Arytenoids

Ligaments of larynx

The ligaments are classified as intrinsic ligaments and extrinsic ligaments.

The extrinsic ligments connect the larynx with the hyoid and trachea.

The thyrohyoid membrane connects the upper border of thyroid to the hyoid bone .

The membrane is pierced by superior laryngeal nerve and vessels[26]. The Cricothyroid Ligament connects the upper border of the cricoid to The lower border of thyroid cartilage .

The hyoepiglottis ligament connects hyoid to the epiglottis. The Intrinsic membrane is a fibroelastic membrane which connects the laryngeal cartilages, strengthens the joints and creates an internal frame work.

TABLE:2

	Upper Quadrilateral Membrane	Lower conus elasticus
Superior attachment	Aryepiglottic fold	Thyroid to vocal process
Inferior attachment	Vestibular folds	Cricoids
Ligaments	Inferior border of vestibular ligament	Superior border of vocal ligament

Muscles of Larynx :

The muscles of the larynx can be divided into extrinsic and intrinsic muscles.

TABLE:3

Sl No	Name of the muscle	Attachment	Function	Nerve
1.	Posterior Cricoarytenoid	Cricoid Lamina to muscular process of arytenoids	Opens the glottis (Abduction)	Recurrent Laryngeal Nerve
2.	Lateral Cricoarytenoid	Cricoid Lamina to muscular process of arytenoids	Closes the glottis (Adduction)	Recurrent Laryngeal Nerve
3.	Interarytenoid	Arytenoid to Arytenoid	Closes the posterior commissure	Recurrent Laryngeal Nerve
4.	Thyroarytenoidis (Vocalis)	Thyroid to the Arytenoid medial fibres	Internal Tensor	Recurrent Laryngeal Nerve
5.	Cricothyroid	Cricoid to thyroid	External Tensor	External Laryngeal Nerve

Interior of the Larynx

The cavity extends from laryngeal inlet to the beginning of the lumen of the trachea at the lower border of cricoid cartilage and is divided by the vestibular and vocal folds into three compartments.

The superior vestibule is above the vestibular folds .The Ventricle or sinus of the larynx lies in between vestibular and vocal folds.

The Inlet is formed by aryepiglottic folds with free margin of epiglottis and mucosa in between the arytenoids and this is called as epilarynx.

Glottis is defined area of larynx that lies at level of vocal cords to level of about 10mm below the vocal cords.

Subglottis is region of larynx extending from 10mm below the vocal cords to level of lower border of cricoid cartilage.

The sinus of the larynx is situated in between vestibular and vocal folds elongated in the anterior part as saccule. The saccule contains mucous glands and hence is known as oil can of larynx.

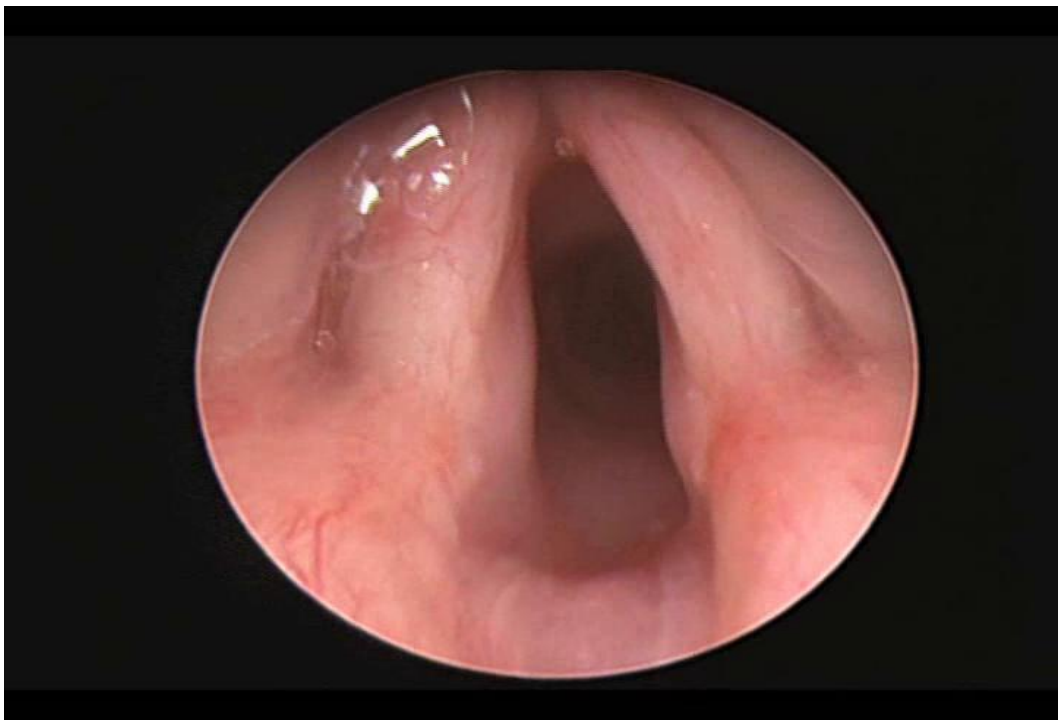


Fig 3 : showing the normal vocal cords ,interarytenoid area and subglottic region.

Mucous Membrane[56] :

The supraglottic and subglottic areas are lined by pseudostratified ciliated columnar epithelium. The squamous epithelium is seen over the vocal cords and Transitional epithelium on few places .The mucous glands are situated all over the membrane more so over the posterior surface of epiglottis and saccule but devoid over the vocal cord .The vocal cords are lubricated by the saccule.

Spaces in the Larynx.

Preepiglottic space

Is a Potential space in front of epiglottis. It has a rich supply of lymphatics.

Boundaries

Anterior - Thyrohyoid membrane and Thyroid cartilage

Posterior- Epiglottis

Lateral – Communicates with the paraglottic space

Inferior – Attachment of epiglottis with thyroid cartilage

Superior – Hyoepiglottic ligament

Paraglottic Space (Space of Tucker)

Lies on the both sides of the larynx lateral to saccule and anterior to the pyriform fossa.

Boundaries

Anterior - Communicates with pre epiglottic space

Posterior- anterior reflection of the pyriform fossa .

Lateral – Thyroid lamina

Medial - Quadrangular membrane and conus elasticus

Reinke' s space

Sub epithelial space lying over the vocal ligaments

Boundaries

Anterior - Anterior commissure

Posterior- Posterior. commissure

Lateral – Vocalis muscle

Medial - Free margin of vocal cord

Superior – superior arcuate line

Inferior – Inferior arcuate line

Physiology of pharynx[56]

The act of swallowing is be divided into three phases:

1. **The oral phase** is the only voluntary phase.

It has preparatory and propulsive stage. The preparatory phase requires the food to be within the oral cavity and

Oropharyngeal sphincter to be closed and process of mastication is initiated .

The resulting bolus is ready to be propelled by the tongue into the Oropharynx, here the propulsive stage starts and bolus is pushed against the hard palate and the palatoglossal sphincter relaxes, soft palate pulled upwards and base of the tongue falls forwards and inferiorly

2. **The pharyngeal phase** is an involuntary phase and consists of a very complex mechanism.

The laryngeal inlet is closed by superior movement of larynx and epiglottis closing the inlet and closure of nasopharyngeal isthmus.

Opening of the cricopharyngeal sphincter , creates negative suction pressure. Once the bolus enters the oesophagus, aided by the gravity, pharyngeal constrictors contract from above downwards and squeezing the remnant food.

3. **The oesophageal phase** is again involuntary, and propels the foods.

It is an involuntary phase .The food passes through the oesophagus by peristaltic waves and the cardiac sphincter opens and food enters the stomach which lasts for 8-20 seconds ,

FUNCTIONS OF THE LARYNX

Sphincteric Action; Protective Mechanism Sphincter actions of the laryngeal inlet (Epiglottis) ,Ventricular bands and Vocal cords prevent the entry of foreign body into the larynx. This is called the three tier mechanism

Cough Reflex.

It is a important protective mechanism. Cough is produced by a forced expiration against closed glottis that is suddenly opened.

Respiratory conduit.

Passage of air through the larynx easily, and mucociliary clearance of fine particles.

Negative suction pressure which increases the preload

Effort closure

During climbing, defecation, micturition, closure of the glottis prevents escape of air from the chest making it easier to increase the intraabdominal pressure .

The Biomechanics Of Phonation [53, 55]

Initiation of voice

Initially the sub glottic pressure builds up against the closed glottis and then the air is forced through the vocal cords which vibrate at fundamental frequency .

The phases of the vibratory cycle can be classified, into four stages

1. Closing Phase
2. Closed Phase
3. Opening Phase
4. Open Phase

The Laryngeal tone is modulated and amplified by resonators such as the mouth, sinus and pharynx.

COBLATION — "Controlled Ablation[45]"

Uses bipolar high frequency electrical energy to excite the electrolytes in a conductive medium(Normal saline , Ringer lactate) creating a precisely focused plasma field.

The energized particles in the plasma have sufficient energy to break organic molecular bonds, excising or dissolving soft tissue at relatively low temperatures(60 - 70°C) thereby preserving the integrity of surrounding healthy tissue.

Advantages of Coblation

1. Functions at much cooler temperatures (40-70°C vs. 400-600°C for non-coblation devices).
2. More precise with minimal effect to the surrounding tissue.
3. Active plasma field is only 100-200µm thick (~thickness of a sheet of paper)

Advantages of Coblation Technology over other soft tissue removal options:

1. MIS approach through a small slit allowing 1-2.5mm wand tipintroduction, no surgical window opening needed.
2. One time entry, no back and forth entry/exit around sensitive anatomy.

COBLATOR

Coblator is a bipolar radiofrequency electrosurgical system

Parts

1. Radiofrequency electrosurgical controller
2. Power cord
3. Foot control
4. Flow control valve unit
5. Flow control cable
6. Sterile wand

Controller is the power source that delivers radiofrequency energy to the treatment site via the wand.

Coblator is contraindicated in any procedures where a conductive solution is not used .

Coblator is contraindicated for patients who have pacemakers or any other electronic implants

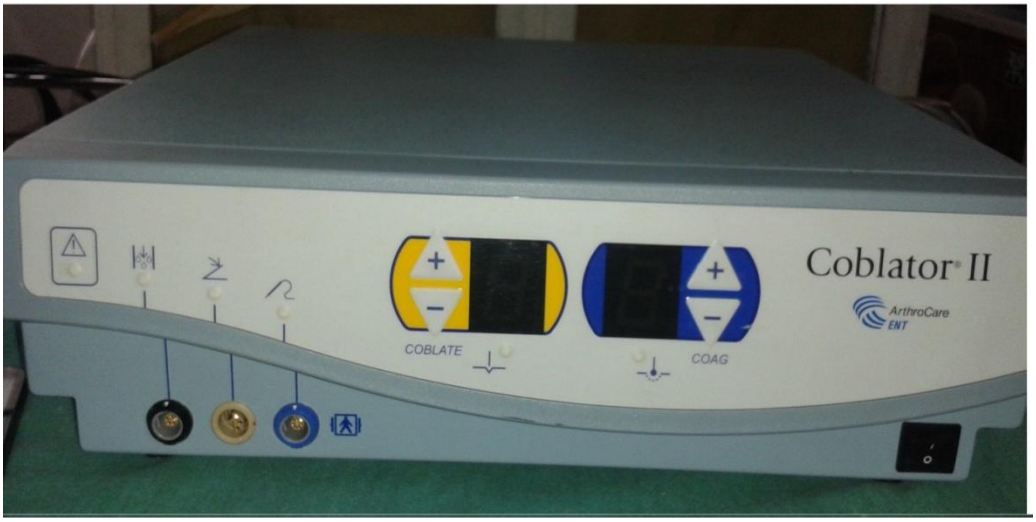


Fig 4: showing Coblator system with Radiofrequency electrosurgical controller

Principle of operation of apparatus ;

Coblator system controller is designed to deliver Radiofrequency energy to the electrodes located at the distal end the wand .Current flows between the active electrodes element and the return element providing a localized energy field.

The result of this arrangement is controlled energy delivery with minimal collateral tissue damage Coblator system works by passing Radiofrequency energy through a conducive solution (such as a normal saline) in close proximity to or in contact with the tissue to be treated .

The conductive solution solution forms a thin layer between the active and return electrode elements .

Fig 5 : showing Foot control and Flow control valve unit

Fig 6 showing Tonsillar wand

Fig 7 : showing laryngeal wand

In the coblate mode, when sufficient energy is applied the conductive solution is converted into a vapour layer containing energized charged particles. When the high energy charged particles come in contact with tissue, they cause its disintegration through molecular dissociation.

This mode of operation results in relatively low treatment site temperatures when compared to conventional electrosurgical systems, thus yielding limited collateral thermal damage of the surrounding untreated tissue.

The function of the device is different when low voltage is applied between the active electrode and the target tissue .In this case, the electrical field is below the threshold required to create

plasma layer and resistive tissue heating occurs .This mode is useful when greater thermal is required that is for coagulation of blood vessel . The appropriate voltage setting will depend on the wand used tissue type and desired tissue effect .

Voltage outputs

The Coblation and coagulation voltage level settings are indicated by a single digit LED output display on the front panel of the controller.

Coblate Mode

Display	Output Voltage (Vrms +/_ 10 %)
1	100
2	127 .5
3	155
4	182.5
5	210
6	237.5
7	265
8	290
9	300

Coagulation Mode

Display	Output Voltage (Vrms +/_ 10 %)
1	65
2	70
3	75
4	81
5	87
6	93
7	100
8	108
9	115

When the controller is first powered on with no wand attached, the display digit 0 appears on both front panel displays as default setting.

If a wand is attached a or after power up ,the unit will adjust he outputs to nominal setting .These will usually provide the best effect in most situations .

Once the wand is connected, the voltage level can be increased or decreased by pressing the coblate level adjustment or he coagulation level adjustment buttons located on the front panel.

The conductive media could either be normal saline or Ringer lactate source must be higher than the patient for proper operation .

Recommended 1meter/3 feet

System Storage

Temperature range -40 degree C to + 70 degree C .

The relative humidity should be between 10- 85

Pathology and its surgical approaches

Acute Tonsillitis

Acute inflammation of tonsil which usually occurs in children or Adolescents .Inflammation Tonsil may be associated with inflammation of the pharynx.

Most common organisms are beta haemolytic Streptococci, Staphylococci Hemophilus influenza, Virus like Adenovirus, Rhinovirus, Cox sackie virus.

Types of Acute inflammation

1. Acute parenchymatous tonsillitis
2. Acute follicular tonsillitis
3. Acute membranous tonsillitis .

Chronic Tonsillitis

Chronic inflammation of the tonsils usually starts as an acute inflammation. The crypts are filled with organisms and chronic inflammatory cells, exudates and debris .

1.Chronic parenchymatous tonsillitis

Fig 8: showing Chronic Parenchymatous Tonsillitis

Tonsils are uniformly enlarged and congested. Sometimes the enlargements is such that they touch each other and are called kissing tonsils.

2. Chronic Follicular Tonsillitis

Fig 9 : showing Chronic Follicular Tonsillitis

Beads of white discharge are present on the surface of the tonsils at the entrance to tonsil crypts.

3. Chronic Fibrotic tonsillitis

The Tonsils are small and inflamed .Occurs in the adults. Anterior pillars are hyperemic.

The most reliable sign is enlarged non-tender jugulo-digastric lymph nodes.

Clinical Features

1. Sore throat – repeated attacks with remission in between the attacks .

2. Difficulty and pain swallowing

3. Pain around the neck

4. Chronic dry cough and throat irritation

5. Halitosis

6. In hypertrophic tonsillitis - Breathing problems and snoring.

Clinical Examination

Throat Examination -

Clinical Grading of Tonsillar Enlargement (54)

Grade I - Tonsil occupy 25% of the faucial isthmus

Grade II - Tonsil occupy 50% of the faucial isthmus

Grade III - Tonsil occupy 75% of the faucial isthmus

Grade IV- Tonsil occupy 100% of the faucial isthmus

Characteristic Signs of chronic tonsillitis are

1. Hypertrophied or atrophied Tonsils

2. Residual congestion of the Anterior pillar

3. Enlarged Non -tender Jugulo -digastric lymph nodes \

4. Extrusion of purulent discharge on pressure over the tonsils with two tongue depressors .(Irwin Moore's sign)

Complications of Chronic Tonsillitis

I . Local complications

1. Pharyngitis

2. Laryngitis

3. Peritonsillar abscess

4. Parapharyngeal Abscess

5. Middle Effusion

6. Otitis Media

II .Systemic complications

1. Rheumatic arthritis and Rheumatic heart disease

2. Infective Endocarditis

3. Glomerulonephritis

4. Sleep Apnea syndrome

Chronic Adenoid hypertrophy [54]

Aetiology

1. Associaed with recurrent upper respiratory tract infections

2. Physiological hypertrophy in young children

3. Allergic rhinosinusitis

Adenoid facies

A child with adenoid hypertrophy has a characteristic facial expression

1. Open mouth and mouth breathing

2. Pinch nose

3. Crowded teeth and hyperplasia of gums

4. Loss of Nasolabial fold

5. Under slung mandible

6. High arched palate

7. Short upper lip

8. Hypoplasia of maxilla

9. Vacant expression

10. Pectus Excavatum

11. Rounded shoulders

12. Mental condition – subnormal and inability to concentrate and fix the attention called Guye's Aprosexia.

Clinical features of Enlarged Adenoids

1.Nasal Obstruction

It can partial or complete obstruction Patient presents with snoring and mouth breathing .In infants it causes difficulty in feeding and hence failure to thrive.

2.Nasal Discharge

3.Change of voice - Hyponasality

4.Eustachian Tube obstruction

Adenoids cause mechanical obstruction of the Eustachian tube opening Causing recurrent otitis media and conducive hearing loss.

It leads to Recurrent Acute Otitis media ,chronic suppurative otitis media and Atelectasis of the tympanic membrane.

5. Snoring and sleep apnea syndrome and secondary pulmonary hypertension .

6. Infection -

Leads chronic Sinusitis, Chronic Tonsillitis and Chronic pharyngitis, Chronic otitis media.

7. Growth and Development

Chronic Obstruction to airway and feeding problems leads failure to thrive in infants .It is due to abnormal regulation of the growth hormone that occurs in REM sleep.

8.Cardio-pulmonary problems

Severe Cases of Obstructive sleep disorders results in cor - pulmonale, pulmonary vascular hypertension, Alveolar hypoventilation ,hypercapnia, hypoxia, with respiratory academia , Right ventricular dilatation and finally cardiac failure.

9. Disorders of Masticatory apparatus

Mal -development of upper jaw ,arched or Gothic palate due o absence of pressure of the tongue on the hard palate ,Dental malocclusion and undershot jaw.

10. Somatic effects

Flat Chest, Rounded shoulders, thirst and loss of appetite. Effects on Intelligence, restlessness, apathy, poor academic performance and mental development.

Clinical Grading of Adenoid Enlargement

Grade I - Adenoids occupy 25% of the Nasopharyngeal lumen

Grade II - Adenoids occupy 50% of the Nasopharyngeal lumen

Grade III - Adenoids occupy 75% of the Nasopharyngeal lumen

Grade IV- Adenoids occupy 100 % of the Nasopharyngeal lumen

Surgical Removal of tonsil and adenoid is called Adenotonsillectomy .

Indications for tonsillectomy

A. Absolute

1. Recurrent attacks of Acute Tonsillitis (More than 6 episodes in a year).
2. Tonsillar hypertrophy obstructing respiration .
3. Enlarged tonsil causing snoring and obstructive sleep apnea syndrome
4. Malignancy of tonsil

B. Relative

1.Chronic Diphtheria carrier

2.As an approach to elongated styloid process excision .

3.Tonsillolith

4.Perionsillar Abscess

Contraindications

1.Aneursym of Tonsil

2.Epidemic of poliomyelitis

3.Age below 3 years

4.Cervical Spondylosis

Methods of Tonsillectomy

1.Gullitone method

2.Cold Steel dissection Method

3.Coblation Method

4.Cryosurgery technique

5.LASER Tonsillectomy

6. Harmonic scapel Method .

Main Complications of Tonsillectomy are

1.Hemorrhage -

A. Primary Hemorrhage - Occurs at the time of surgery .

B. Reactionary Hemorrhage – Occurs within 24 hours of surgery

C. Secondary hemorrhage -Occurs after 24 hours of surgery

2.Infections

3.Lung Complications – Aspiration, collapse of lung .

Indications for Adenoidectomy

1.Enlarged Adenoids causing Nasal Obstruction and snoring

2.Recurrent Upper Respiratory tract Infection

3.In complications like CSOM and serous otitis media .

Methods of Adenoidectomy

1.Adenoid Currettage using St .Clair Thompson Adenoidectomy curette.

2.Coblation Assisted Adenoidectomy

3.Microdebrider Assisted Adenoidectomy .

Non Malignant Lesions of the Larynx

Is defined as any lesion or mass in the larynx which does not present with the characteristics of malignancy is called a Non- Malignant lesion of the larynx .It can divided into 2 types

1.Benign Neoplastic lesion

2.Benign Non Neoplastic lesion

Benign Neoplastic Lesion is classified as follows ;

TABLE:4

Tissue of origin	Lesion
Epidermal	Papilloma
Neural	Neural Fibroma Schwannoma Paraganglioma
Glandular	Oncocytic tumour
Vascular	Hemangioma Arterio-Venous malformation
Cartilagenous	Chondroma
Miscellaneous	Lipoma Fibroma Rhabdomyoma

Benign Non Neoplastic lesion

Congenital	Laryngocele Lymphangioma Saccular cyst Laryngeal webs Congenial subglottic stenosis Subglottic Hemangioma Laryngeal and laryngo- tracheal oesophageal cleft
Traumatic	
Inflammatory	Keratosis Vocal polyp Vocal Nodule Reinke's Edema Intracordal cyst Contact Ulcer
Granuloma	Bacterial Tuberculosis Leprosy Syphilis Rhinoscleroma Fungal Rhinosporidiosis Candida

Benign Neoplastic lesion 85% of the benign lesions are papilloma of larynx out of which 25% Were Recurrent Respiratory papillomatosis.

Two Principle out come of these lesion are

1.Phonatory dysfunction

2. Obstructed Airway

Papilloma Larnyx

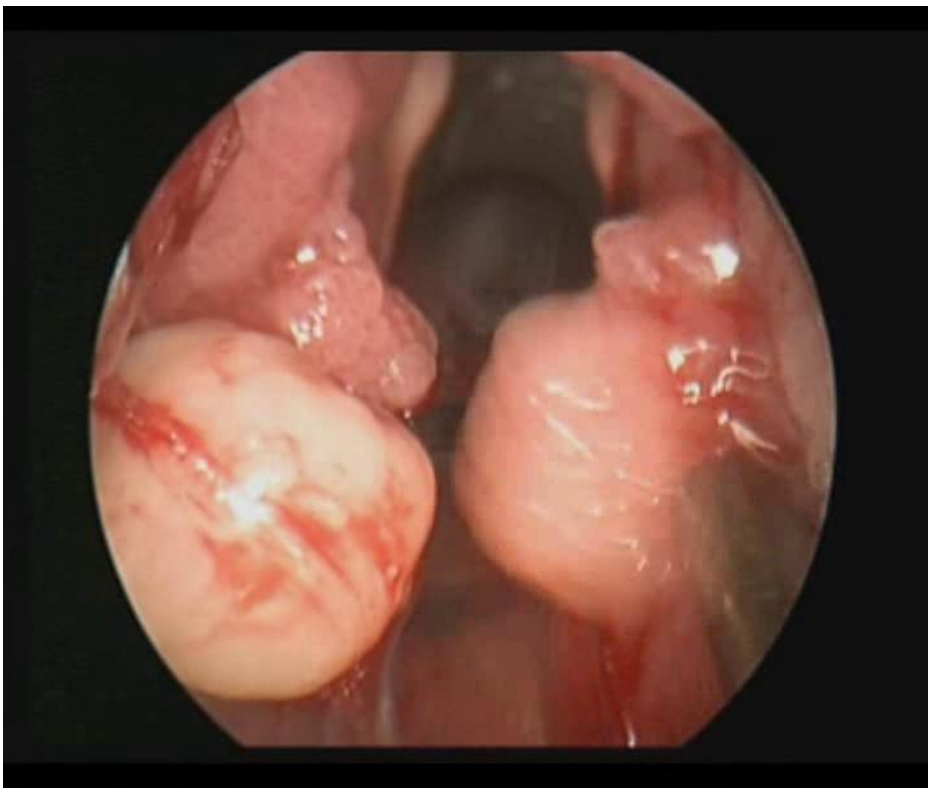


Fig 10: showing Multiple papillomatous lesions in the supra glottis.

These are squamous in origin, colour ranges from white to red, are usually sessile, may keratinizing or non keratinizing .

The Adult type and children type are histologically the same but tumour behaviour is different and they belong to clinically different groups .

Juvenile Papilloma of larynx

Recurrent Respiratory Papillomatosis

This disease has a world wide distribution and involves all Socioeconomic groups.

In children, there is a female preponderance. Myres and Barnes found that 84% of the benign laryngeal tumours were papillomas.

Aetiology of Laryngeal papilloma [53]

Caused by Human papilloma types 6 and 11

Following infection the virus may remain in the basal layer of the mucous membrane replicating by a process known as episomal maintenance, where virus is undetectable but its presence can be determined by DNA hybridization technique.

Characteristics

Occurs in clusters ,multiple non keratinising lesions which recur even after radical stripping .The symptoms occurs before the age 4 years .

The symptoms are :

Hoarseness of voice

Abnormal cry

Dyspnea

Later stridor

The papillomas occur more on the anterior aspect of larynx because of the thick blanket with rapid clearance has a protective effect on he posterior aspect of the larynx .It can extend up to trachea and major bronchi.

Natural History

The transmission occurs from the mother with genital warts to children in about 60% .The remission can take place at any age unrelated to treatment and relapse can occur at any age.

The malignant transformation is very rare and seen after radiotherapy or in smokers .

Management

The Treatment of choice is microlaryngeal Laserization or Coblation Assisted Excision.

Adjuvant therapy -Systemic Cis –Retinoids

The recurrence rate is reduced but serious side effects like skin excoriation occurs.

Indole -3 – carbinol a natural derivative of cruciferous vegetables.

Interferons -causes only decrease in recurrence or temporary remission.

Avidano and Singleton reported the use of methotrexate in three patients

Intralesional Cidofovir[53]

Adult papilloma

The papilloma are solitary small and less aggressive in behaviour than juvenile type .It occurs on the vocal cords. The histology consist of fronds of connective tissue covered by well differentiated squamous epithelium with no invasion of stroma or sub mucosa. Malignant transformation is more frequent.

Laryngeal paraganglioma

It arises from the paired superior and inferior paraganglia Situated in relation to superior laryngeal nerve and loop of Gallen.

Clinical features ;

Usually presents a small a red painful mass located on the aryepiglottic fold. The striking feature is pain radiating to the ear which resolves after biopsy or excision .They are very vascular and may bleed profusely during resection, if injured

Treatment : Surgical excision by open surgical technique or endoscopic removal .

NeuroFibroma

Commoner in patients with Von Reckinghausen's disease or rarely as solitary lesion . They are bulky slow growing mass over aryepiglottic fold and false vocal cord.

Voice change, fullness in the throat and slowly developing dyspnea are the other features .

The treatment is surgical excision.

Haemangioma

The haemangioma should be differentiated from granulation tissue in all cases. The haemangioma are of two types adult and congenital.

The congenital type occurs in children in the subglottic area and undergoes spontaneous remission.

If remission does not occur endoscopic surgical excision preferably with laser is done.

But in adult due o the bigger diameter of vessels, this less successful .The adult type lesion occurs in the glottis or

supraglottic areas producing hoarseness and stridor and is treated by open surgical excision.

Miscellaneous Tumours

The Chondroma occurs between the age group of 40- 60 years, with 5: 1 male : female ratio.

About 20% of these tumours can undergo malignant transformation .They present clinically as a smooth, globular \ encapsulated mass and wide excision is the treatment of choice.

The Lipoma, Fibroma and Rhabdomyoma are very rare .

The granular cell tumours occurs between age group 30-50 years.

The etiology is not clear .

It may be congenital ,Neoplastic or degenerative. They have PAS positive granular cytoplasm with pseudo epitheliomatous hyperplasia. Surgical excision is the treatment of choice

Cysts of the larynx are common, Epiglottic cyst,vallecular cyst Which are fluid filled cavity lined by stratified squamous

epithelium ,slow progressive enlargement causing symptoms based on its location .Diagnosed and confirmed by videolaryngoscopy and FNA. Treatment involves either complete excision or marsupialisation. Management of Benign Laryngeal lesions .

1. LASER Assisted excision of the lesions

LASER - is an Acronym for light Amplification by stimulated emission of Radiation . It is capable of generating an intense almost parallel beam of electromagnetic energy of a given wavelength .

In 1961 Johnson developed Neodymium doped (Nd) Yttruim –Aluminium Garnet(YAG) that emitted a laser near the infrared portion of the Spectrum. The Argon Laser was developed by Bennet et al .

The Carbon dioxide laser was developed by Patel et.al.

2.Microlaryngeal Excision

3. Open surgical techniques like Laryngofissure and lateral Pharyngotomy.

Bilateral Abductor palsy –

It is neurological disorder ,in which both the vocal cords are paralysed and are located in the midline and which requires emergency tracheostomy due to involvement of both the recurrent laryngeal nerve .

Two types -Congenital

Acquired - common causes are total thyroidectomy , Brain stem injury or lesions

Management - Lateralisation thyroplasty ,Dennis Kashima's procedure, Arytenoidectomy.

Snoring and Obstructive sleep apnea syndrome

Snoring is part of the spectrum of Sleep Disordered Breathing (SDB) from Obstructive Sleep Apnoea/Hypopnoea Syndrome (OSAHS) at one end to simple snoring at the other[3].

The entire spectrum is characterised by changes in the physical conformation, structural properties and neuromuscular function of the pharynx.

About 50% of the population above age of 30 years snore. Snoring is more common in obese males .Alcoholism and smoking increase risk of snoring Sleep is a temporary state of unconsciousness which can be interrupted by external stimuli . It is organised into a cyclic pattern of sequential stages .

Two phases of sleep[53] are

1. Quiet or Non Rapid Eye Movement sleep-

EEG waves – progressively slow down and increase in amplitude

2.Active or Rapid Eye movement sleep

It is further subdivided 4 stages

Stage 1 and 2 EEG – Low voltage and frequency is mixed

Stage 3 and 4 EEG – High voltage and Slow frequency Predominant sleep stage is stage 2 and accounts for about half of the adults sleep .

During REM sleep has been characterised by into two patterns Tonic REM sleep associated with muscle tone depression

and phasic REM associated with periods of rapid Eye movements and twitching movements of face and limbs .

In normal sleep resting muscle tone acts against gravity to keep the airway patent, however a relative decreased muscle tone still occurs in the upper airway in comparison to the awake state.

Most dreams happen during REM sleep and there is increased autonomic activity with marked fluctuation in blood pressure, heart and respiratory rate.

A typical sleep pattern usually starts with stages 1 and 2 of non REM sleep which is often alternates with wakefulness before entering the deeper slow wave sleep (SWS).

REM sleep occurs for the first time approximately ninety minutes after the onset of sleep and then recurs about four to six times during a sleep.

REM sleep is about 25 percent of the total sleep time and as sleep Progresses the REM periods become longer and the non-REM periods shorter.

Respiratory sleep disorders consists four syndromes:

1. obstructive sleep apnoea/hypopnoea (OSAH);

2. central sleep apnoea/hypopnoea;

3. Cheyne-Stokes breathing;

4. sleep hypoventilation.

Snoring is due to obstruction at three levels

1.Nose

2.Oropharynx

3.Hypopharynx

Apnoea - Cessation of Airflow flow at the nostrils and mouth for atleast

10 seconds .

Hypopnoea - A 50% reduction in the thoraco-Abdominal movement lasting for 10 seconds in the presence of continued airflow.

Apnoea-Hypopnoea Index – The number of Apnoea and hypopnoas averaged per hour of sleep

Primary Snoring : patients who snore and in whom Apnoea-Hypopnoea Index is less than 5 and who do not complain of excessive day time Sleepiness.

Upper Airway Resistance syndrome : Apnoea-Hypopnoea Index is less than 5 with snoring and an increased arousal index .

Sleep Apnoea Syndrome :

Apnoea-Hypopnoea Index is less than 5 with snoring and decreased oxy-hemoglobulin saturation of 90% or less with excessive day time Sleepiness.

Grading of obstructive sleep apnoea/hypopnoea (OSAH);

It is based on Apnoea - Hypopnoea Index (AHI)

Normal	:	less than 5
Mild OSAH	:	5- 15
Moderate OSAH	:	15 -30
Severe OSAH	:	greater than 30

Clinical Symptoms

Patients are usually obese male who present with complains of Loud snoring

Obstruction to breathing

Excessive Daytime sleepiness

Intellectual deterioration, memory loss

Morning fatigue

Mood and Personality changes

Nocturnal Enuresis

Snoring and Obstructive Sleep Apnea syndrome

Causes for Snoring

1.Enlarged, elongated

2.Prominent Oropharyngeal folds

3.Hyperplastic or Obstructive tonsils

4.Thick soft palate

5.Macroglossia

6.Deviated septum

7.Enlarged tongue base

8.Enlarged nasal turbinates

9.Presence of nasal polyps or any other obstructive mass

Continuous Positive Airway Pressure (CPAP)

It is standard mode of treatment for Mild Obstructive Sleep Apnoea Syndrome.

The Patients wears a face mask over the nose and sleeps The mask is connected to Ventilator Machine that is kept bedside The Machine blows air at pressures between 7-15 cm of H2O into the airway. This helps in maintaining Oxygen Saturation thus preventing secondary cardiopulmonary complications and acts as a pneumatic splint.

Surgical Treatment in OSAH

I.Treatment of Obstructive component in Nose

1.Septal Correction with Coblation assisted Inferior Turbinoplasty .

II. Surgery in the oral cavity ,Oropharynx and neck

1. Coblation Assissted Tonsillectomy and Uvulopalatopharyngoplasty[6]
2. Tongue Base Reduction
3. Mandibular Osteotomy with genioglossus Advancement
4. Infrahyoid Myotomy and Hyoid suspension
5. Maxillary Advancement surgery
6. Permanent Tracheostomy

The specific complications include

1. Severe postoperative pain,
2. Haemorrhage
3. Respiratory events such as laryngospasm,
4. Pulmonary oedema and hypoxia
5. Nasal regurgitation

6. Velopharyngeal stenosis,

7. Swallowing problems

8. Voice changes

Preservation of the uvula eliminates nasal regurgitation and minimizes pharyngeal dryness and swallowing difficulties.

Eliminating the pharyngoplasty part of the UPPP operation, i.e. not suturing the tonsillar pillars after tonsillectomy, can reduce morbidity .

Coblation Assisted Uvulopalatopharyngoplasty (CAUP)

The principle usage of lower power and lower tissue temperatures with a current working at a frequency of 460 kHz .The device applies thermal injury to specific submucosal sites in the soft palate resulting in fibrosis of the muscular layer and volumetric tissue reduction.

The main advantages

1.Day care or outpatient procedure

2.Under local anaesthetic

3.Postoperative pain

Multilevel, temperature-controlled radiofrequency therapy of the palate, base of the tongue and tonsils in adults with OSA was effective in 33 percent of patients.

Radiofrequency volumetric tissue reduction in' the soft palate has no adverse impact on voice quality.

MATERIALS AND METHODS

MATERIAL AND METHOD OF STUDY

The study was conducted in the Department of Otorhinolaryngology of Government Stanley hospital during the period Feb 2013 to Sept 2014.

The hospital caters to a population of about 1.5 lakh and also receives a number of referral cases from all district government hospitals .

METHODS OF STUDY

1. HISTORY, CLINICAL EXAMINATION, INVESTIGATIONS

2. SURGERY –COBLATION

3. POST TREATMENT EVALUATION.

Name ; Age /sex : I.P.no :

Address :

CHIEF COMPLAINTS

THROAT PAIN

DIFFICULTY IN SWALLOWING

SNORING

MOUTH BREATHING

ANY OTHER ASSOCIATED SYMPTOMS

HOARSENESS OF VOICE

INSOMNIA

INCREASED DAY TIME SLEEPINESS

HISTORY OF PRESENT ILLNESS :

Complete detailed description of each symptoms ,aggrevating and relieving factors, Associated symptoms .

Negative history

PAST HISTORY :

Any History of Diabetes Mellitus /Epilepsy /Hypertension/ Tuberculosis /Cardiac Disease/thyroid disorders /Asthma/ Bleeding diathesis.

Any History of previous surgery/Chronic Drug use /Drug allergy

FAMILY HISTORY

PERSONAL HISTORY

Diet

Bladder and bowel habits

Addiction .

GENERAL PHYSICAL EXAMINATION

Built, mental status.

Pallor Icterus Cyanosis Clubbing Pedal edema

General Lymphadenopathy .

VITALS

Pulse Rate :

Blood Pressure:

Respiratory Rate:

Saturation :

Jugular Venous Pressure :

SYSTEMIC EXAMINATION

CardioVascular System:

Respiratory System;

Per Abdomen:

Central Nervous System:

ENT EXAMINATION

ORAL CAVITY AND OROPHARYNX EXAMINATION

Lips, teeth, gums, buccal mucosa, Buccogingival sulcus, Retro Molar Trigone, hard palate, Anterior 2/3 rd tongue, floor of mouth, Anterior pillar, tonsils, soft palate, uvula, posterior pillar, posterior pharyngeal wall.

Indirect Laryngoscopy :

Examination – Base of Tongue, Vallecula, Epiglottis, Aryepiglottic fold, Arytenoids, Vestibular bands, Vocal cords, Glottic chink, tracheal rings Pyriform fossa.

NOSE

External Nose

Vestibule

Anterior Rhinoscopy

	Right	Left
Inferior Meatus		
Inferior Turbinate		
Middle Meatus		
Middle turbinate		

Airway patency tests

	Right	Left
Cottle's test		
Cotton wool test		
Cold spatula test		

Post nasal Examination

EAR EXAMINATION

	Right	Left
External Ear		
External Auditory Meatus		
Tympanic Membrane		
TUNING FORK TESTS		
Facial Nerve Examination		

Investigations

Complete Blood Count

Renal Function Tests

Liver Function Tests

ELISA –HIV /HbsAg

Blood group and Rh typing

Bleeding Time /Clotting Time

Urine analysis

ECG

Chest x ray- PA view

X ray - Nasopharynx soft tissue lateral view

Diagnostic Nasal Endoscopy

It is an Outpatient procedure done under local anaesthesia using 0 degree endoscope .It consists of 3 passes – 1st pass – examination of Inferior Meatus , Inferior Turbinate , Choana ,Nasopharynx.

2nd pass – Sphenoethmoidal recess ,superior meatus ,superior turbinate

3rd pass – Middle Meatus, Middle turbinate ,Uncinate ,Bulla ethmoidalis.

Videolaryngoscopy –

It is an outpatient procedure done under local anaesthesia using 30 degree Endoscope. The following structures are visualised from above below

– Base of Tongue, Vallecula, Epiglottis, Aryepiglottic fold, Arytenoids, Vestibular bands,Vocal cords, Glottic chink, tracheal rings Pyriform fossa .

Epworth Sleepiness scale

1. Sitting and reading
2. Watching television
3. Sitting inactive in a public place (e.g. a theatre or a meeting)
4. As a passenger in a car for an hour without a break
5. Lying down to rest in the afternoon when circumstances permit
6. Sitting and talking to someone
7. Sitting quietly after a lunch without alcohol
8. In a car, while stopped for a few minutes in traffic

Score ; 0 – Never , 1- slight chance ,2- Moderate chance , 3- high chance of dosing

Nasal Endoscopy during sleep

Grading Sleep Nasoendoscopy

Grade 1 – Simple palatal level snoring /palatal flutter

Grade 2 – Single palatal level obstruction

Grade 3 – Palatal obstruction with intermittent Oropharyngeal involvement

Grade 4 – Sustained Multilevel obsruction

Grade 5– Tongue base level obstruction

Grade 6 – Isolated Epiglottic Involvement

VideoEndoscopy Oesophageal manometry-X- ray Skull and neck lateral view to determine posterior airway space and site of airway obstruction .

The Gold standard Investigation is Polysomnography .

It is done in sleep laboratory ,where the patients sleep pattern is monitored throughout the night .

EEG, ECG, EOG, EMG, Oxygen Saturation level, arousals, snore, Apnoea And Hypopnoea Episodes are recorded .

Description of Various Procedure of Coblation Surgery

I .Description of Coblation Assisted Adenoidectomy

About 20 patients diagnosed as Chronic Adenoid Hypertrophy were randomly selected between age group between 10- 45 years .

Clinical history, clinical Examination explained above were done and finding documented .

Adenoid Hypertrophy were graded based on Post Nasal Examination , DNE and in unco-operative patients X ray Nasopharynx – Soft tissue Lateral view was taken.

After explaining the procedure and its complications to the parents and obtaining written consent and fitness for Anaesthesia, the procedure is undertaken. The procedure is undertaken under general anaesthesia with the patient placed in supine position with

orotracheal intubation

Fig 11 : showing Rose's position

Patient is placed in Rose's position and Mouth opened wide using Boyle Davis Mouth Gag and fixed using Draffin's bipod stand.

An infant feeding tube is passed through the one of the nostril and brought out through the oral cavity and tied , to retract the soft palate anteriorly and hold it for easy accessibility to the nasopharyngeal region transorally .

The surgeon stands on the right side of the patient's head.

A 2.7 mm 0 degree rigid scope is introduced through the opposite nostril through which the infant feeding is not passed .

The entire nasopharynx is visualised .

Now, the Coblator Wand is introduced transorally after setting 7 ; 5. 7 – coblation and 5 - coagulation , Saline irrigation and suction apparatus is connected with the tubing .

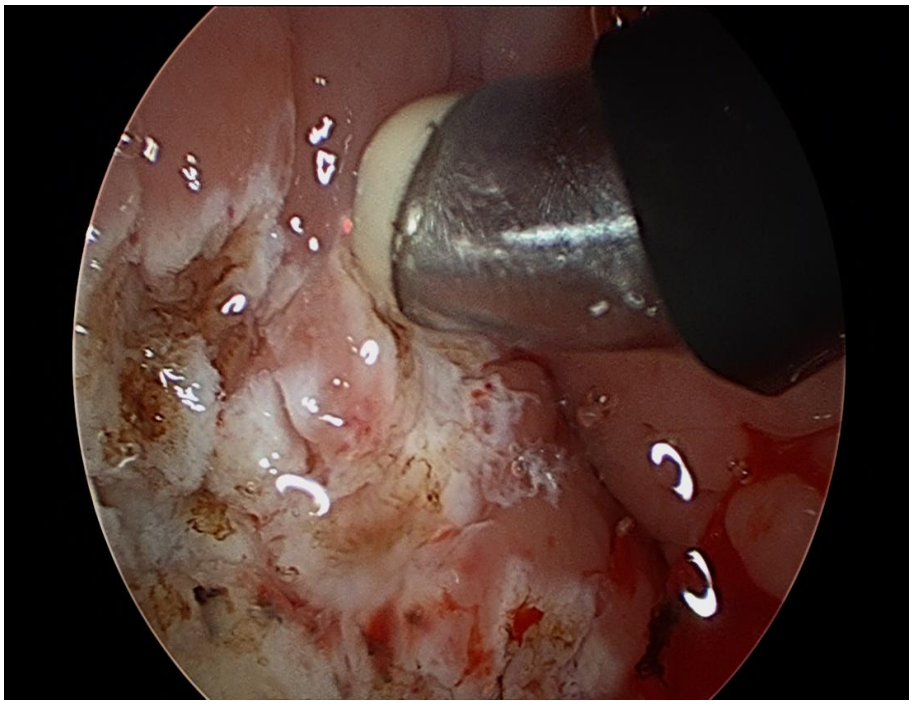


Fig 12 showing Dissection of inferior part Adenoid tissue using coblator wand.

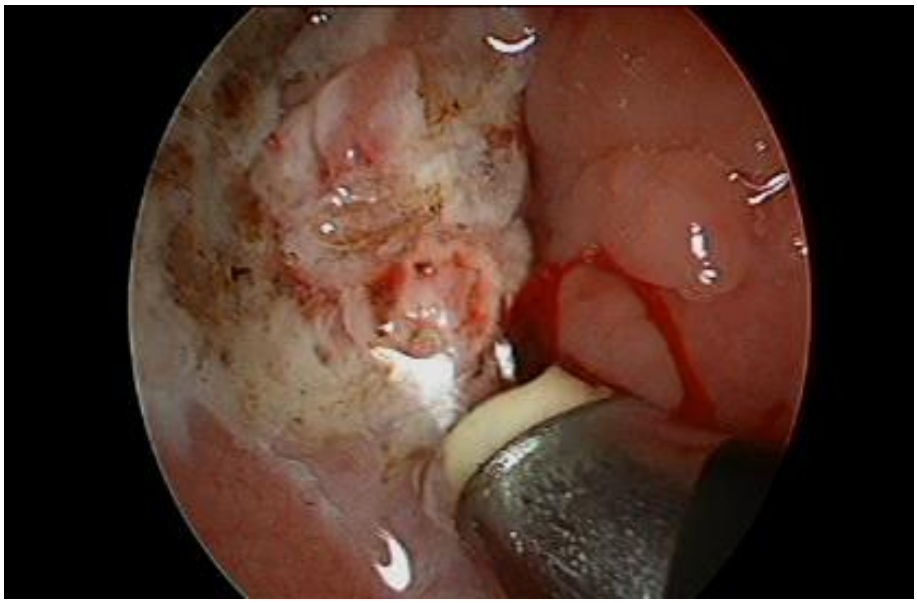


Fig 13 showing Dissection of lateral part Adenoid tissue using coblator wand

Adenoidectomy is performed under direct endoscopic vision. Electrodissection of the Adenoids is started inferiorly , and ascends upwards towards the nasopharynx .

During the electrodissecion ,the tissue are simultaneously dissected and The dissected tissue is suctioned and if any bleeding is present it is immediately cauterised .

The lateral limit of dissection is torus tubaris and adenoid tissue close to torus tubaris is dissected without causing any injury .

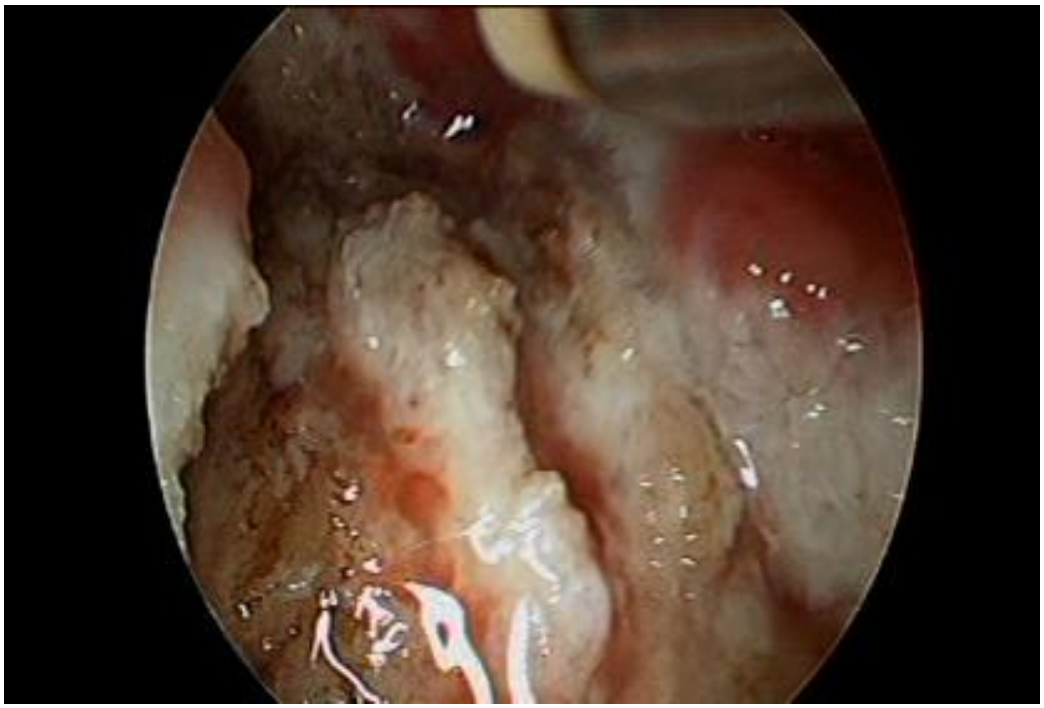


Fig 14: showing Dissection of superior part Adenoid tissue using coblator wand

Adenoid tissue is completely coblated in the roof , so as to no remnant adenoids is present and if any residual bleeding is present it is immediately cauterised .

The limitations of the traditional indirect mirror adenoidectomy are mainly associated to the poor visualization and manoeuvrability.

Thus, the endoscopic transoral approach overwhelms those limitations. More specifically, by the 30° endoscope and in particular in patients with small mouth opening, visualization of the nasopharynx, although better, could be limited.

With a 90° endoscope, although the whole nasopharynx could be effectively visualised , however a closer look into the nasopharynx would be very difficult, and the endoscope and coblator wand would be oriented at different axis, thus limiting manoeuvrability.

By using a 45° endoscope the entire nasopharynx can be easily visualised. In addition, the axis of introduction in both, scope and coblator , is the same so, bimanual coordination is easily achieved.

Post dissection, no post nasal packing is required.

Post op evaluation

1.Intraoperative bleeding

2.Pain score (day 1,3,5,7)

3.Days reporting pain

4.Liquid diet days

5.Postoperative adenoid grade

6.Post operative haemorrhage .

II. Description of Coblation Assisted Tonsillectomy

About 20 patients diagnosed as Recurrent Chronic Tonsillitis were randomly selected between age group between 10- 45 years .

Clinical history, clinical Examination as explained above were done and finding documented .

Tonsillar Hypertrophy were graded based on Clinical Examination and documented .

After explaining the surgical procedure and its complications to the parents and obtaining written consent and fitness for Anaesthesia, the procedure was undertaken.

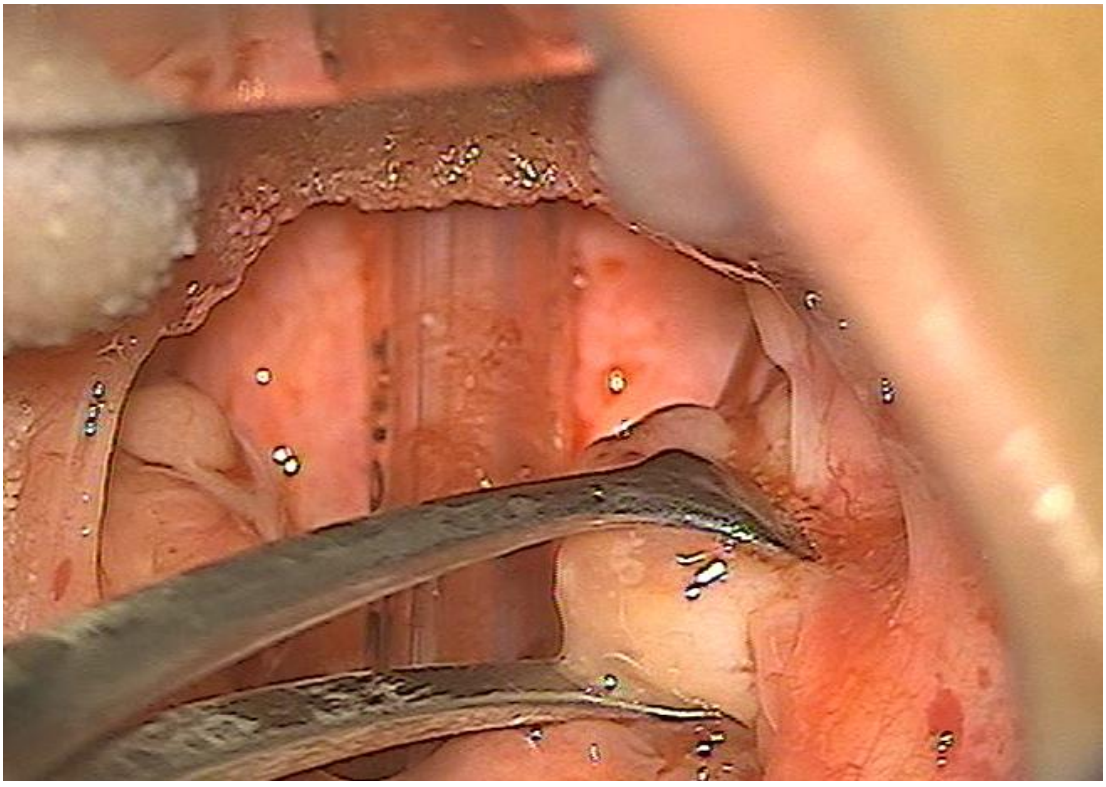
The procedure was done under general anaesthesia with the patient placed in supine position with Nasotracheal intubation.

Patient is placed in Rose's position and mouth opened wide using Boyle Davis's Mouth Gag and fixed using Draffin's bipod stand.

The mouth gag is applied such that the inferior pole of the Tonsil on both is visible .

The surgeon is seated on the cranial side of the patient with microscope with focal length 400 mm .

Now, the Coblator Wand is introduced transorally after setting 7 ; 5. 7 – Coblation and 5 - coagulation , Saline irrigation and suction apparatus is connected with the tubing .



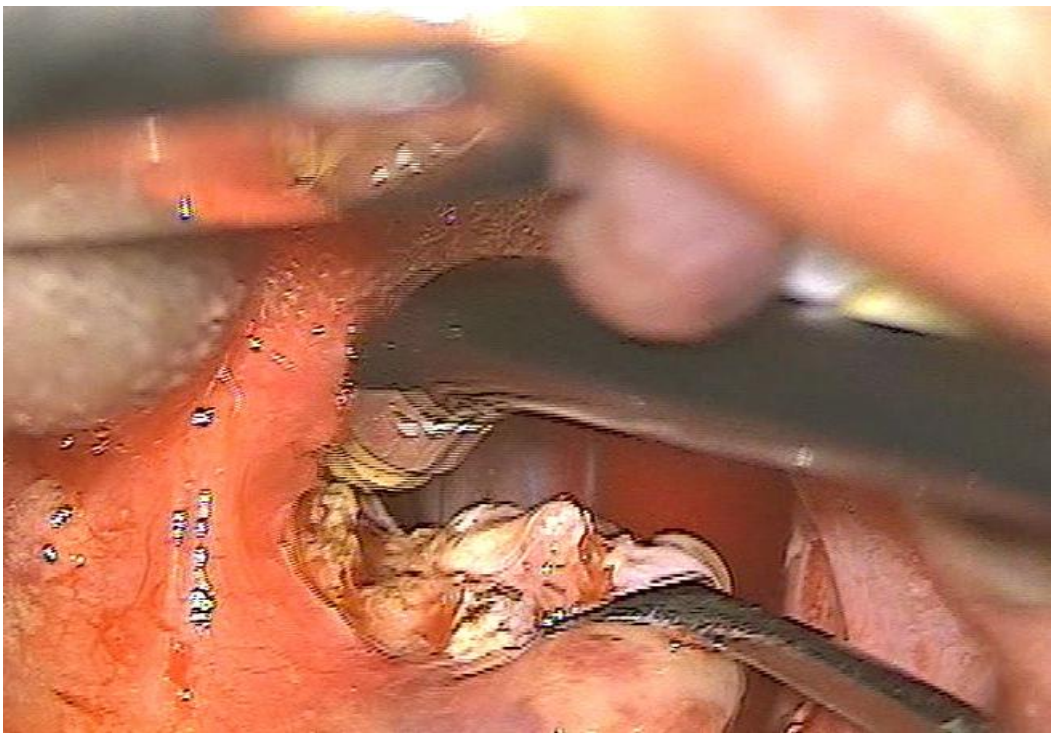


Fig 15 and 16 showing Dissection of tonsil from its tonsillar bed using Coblator tonsillar wand , tonsil is held medially using tonsil holding forceps

The superior pole of the tonsil is held medially using Dennis Brown's Tonsil Holding forceps, Incision is between the mucosa over the tonsil and Anterior pillar using the tonsillar Coblator wand and the superior pole is released .

The tonsil is dissected from the tonsillar bed by either of the methods ,were used intracapsular and extracapsular method along with continuous saline irrigation and suction. Any bleeding points are immediately cauterised .

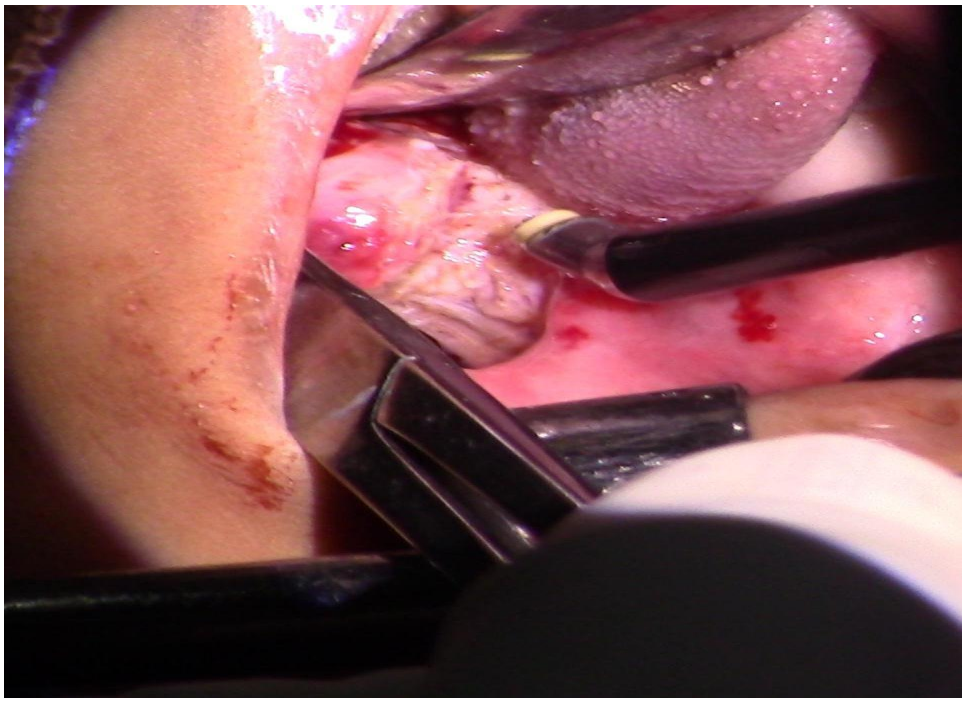


Fig 17 showing dissection of tonsil from the inferior pole

.The Dissection is continued inferiorly until the inferior pole reached and Anteriorly and Posteriorly close to anterior pillar and posterior pillar respectively .

Now the inferiorly pole is coblated and removed and bleeding from the Tonsillar branch of the facial artery is immediately cauterised.

Tonsillar dissection is completed in its entirety ,making sure not to any residual tonsillar tissue , any bleeding points and a

controlled dissection without any injury to uvula ,anterior pillar , posterior pillar and tonsillar bed .

Post operative evaluation

1.Intraoperative bleeding

2.Pain score (Day 1,3,5,7)

3.Days reporting pain

4.Liquid diet days

5.Post operative haemorrhage .

III.Coblation assisted Uvulopalatopharyngoplasty

About 5 patients diagnosed as Simple Snoring were randomly selected between age group between 10- 45 years.

Clinical history ,clinical Examination explained above were done and finding documented .

Oropharyngeal examination – Tonsillar Hypertrophy ,Elongated Uvula (more than 1 cm), base of tongue elevation .

Diagnostic Nasal Examination was done to rule out causes Nasal and Nasopharyngeal Obstruction .

After explaining the procedure and its complications to the patients and obtaining written consent and fitness for Anaesthesia ,the procedure is undertaken

The procedure is undertaken under general anaesthesia with the patient placed in supine position with Nasotracheal intubation.

Patient is placed in Rose ‘s position and Mouth opened wide using Boyle Davis Mouth Gag and fixed using Draffin’s bipod stand .

The mouth gag is applied such that the inferior pole of the Tonsil on both is visible .

The surgeon is seated on the cranial side of the patient with microscope with focal length 400 mm .

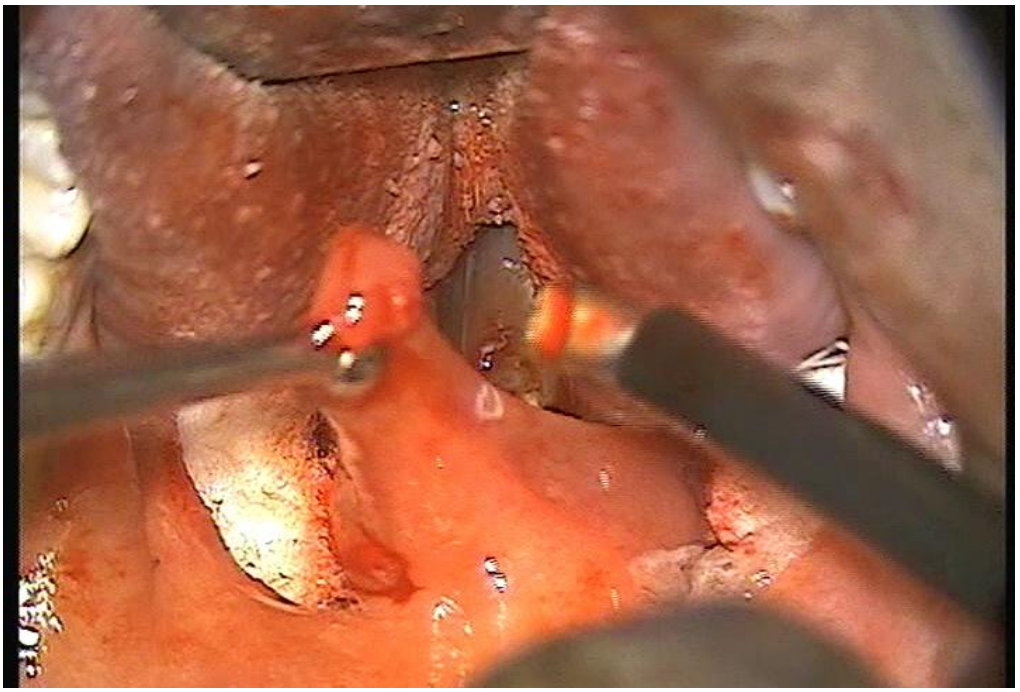
Now, the Coblator Wand is introduced transorally after setting 7 ; 5. 7 – Coblation and 5 - coagulation , Saline irrigation and suction apparatus is connected with the tubing .

Infiltration using 1:80,000 adrenaline : 2% xylocaine is given in the lateral aspect of the soft palate and uvula.

The Right angled wand is used for the soft palate incision on both the sides between lateral border of the soft palate and anterior and posterior pillars and if any bleeding points are present immediately cauterised and making sure of minimal damage to the adjacent healthy mucosa .

Incision is carried through the muscular plane. The Uvula is also resected about 1cm from the distal end of uvula Placement of the electrode is extremely important. The electrode is Entered high in the soft palate so that the end point of the electrodes is just

above the uvula but not in the uvula itself.



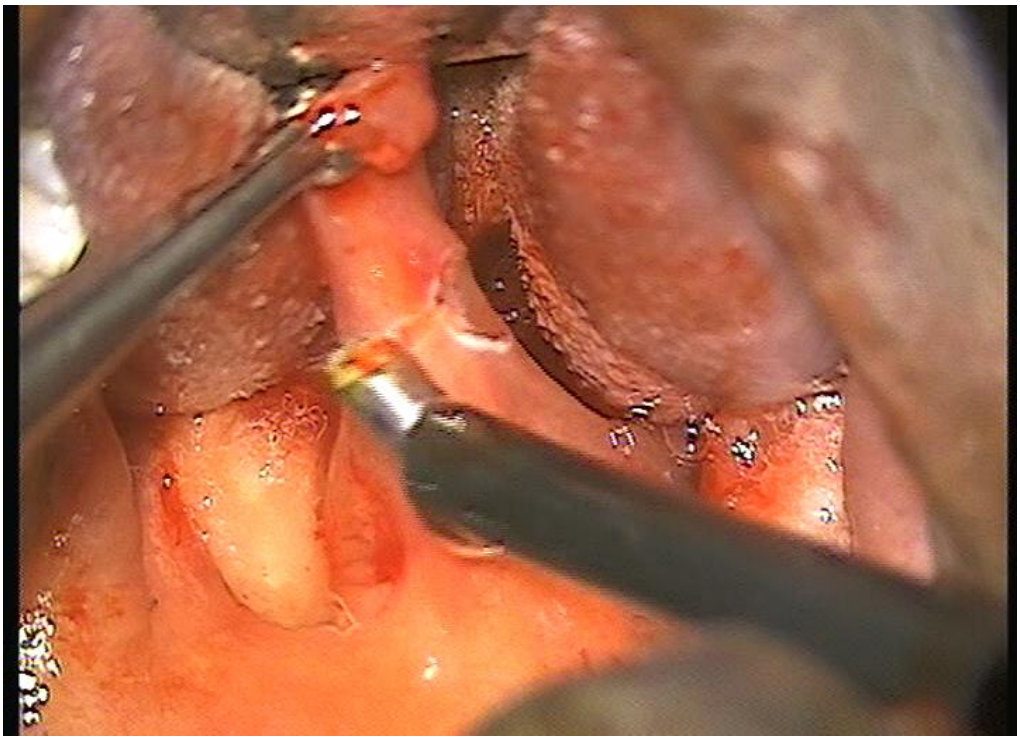


Fig 18 and 19 showing dissection of enlongated uvula using coblator wand.

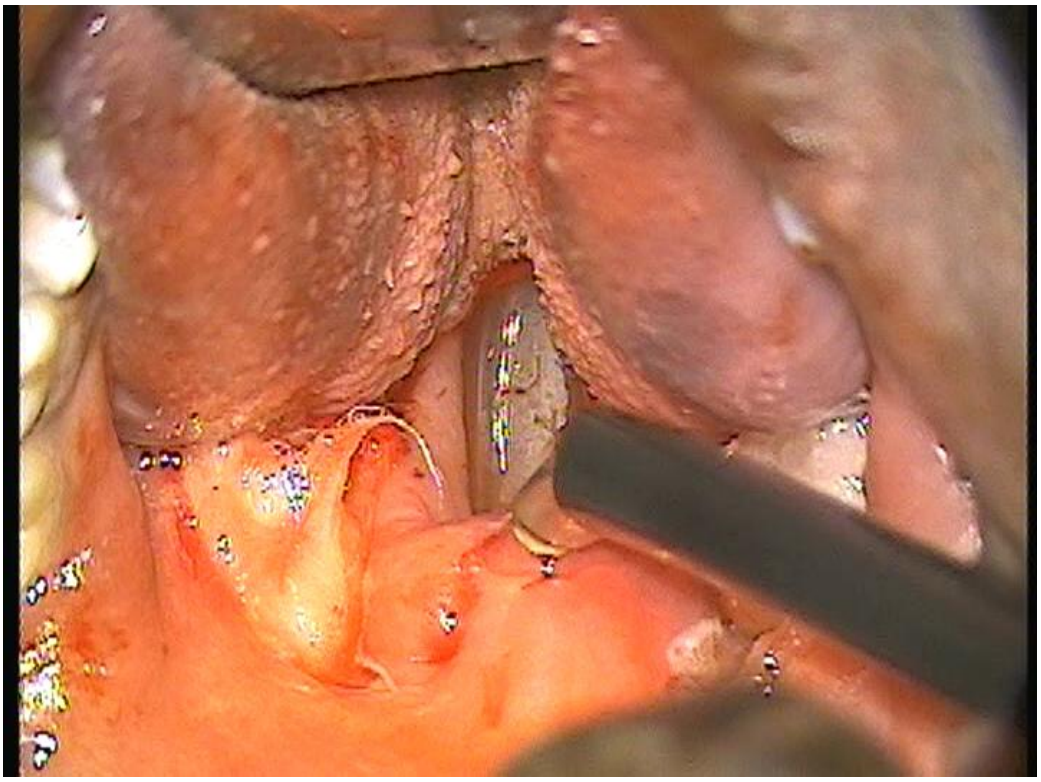


Fig 20 showing coblation of the base of uvula and coagulation of bleeding points

The superior pole of the tonsil is held medially using Dennis Brown Tonsil Holding forceps, Incision is between the mucosa over the tonsil and Anterior pillar using the tonsillar Coblator wand and the superior pole is released .

The tonsil is dissected from the tonsillar bed ,with continuous saline irrigation and suction. Any bleeding points are immediately cauterised.

The tonsillar dissection is done in the plane between tonsillar capsule and the pharyngobasilar fascia .

The Dissection is continued inferiorly until the inferior pole reached and Anteriorly and Posteriorly close to anterior pillar and posterior pillar respectively .

Now the inferiorly pole is coblated and removed and bleeding from the Tonsillar branch of the facial artery is immediately cauterised .

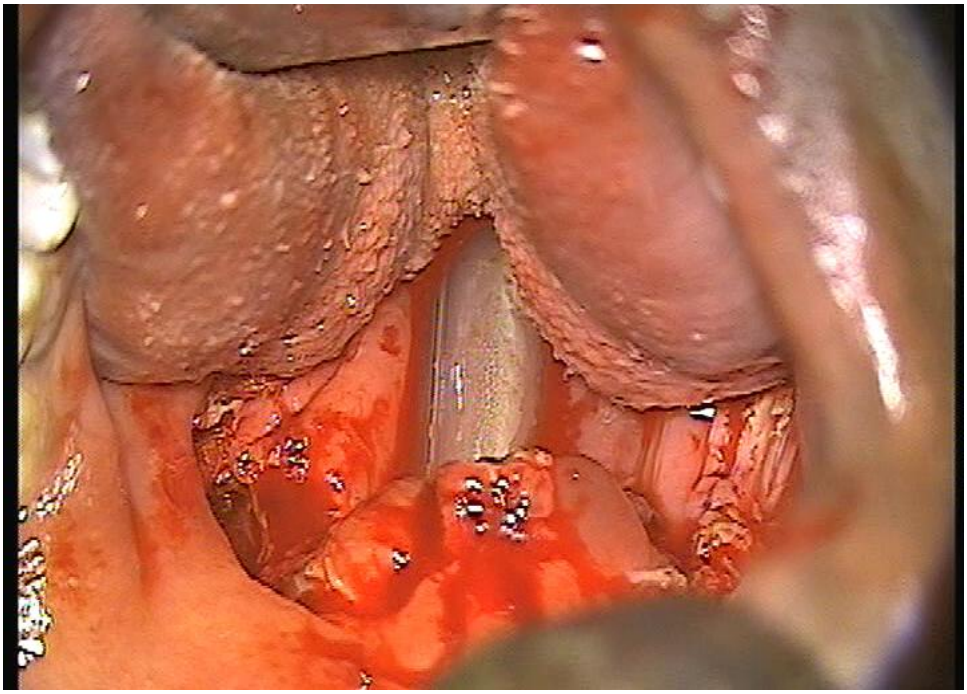


Fig 21 showing surgical field following dissection of both the tonsil and uvula using coblation.

Tonsillar dissection is completed in its entirety ,making sure not to any residual tonsillar tissue , any bleeding points and a controlled dissection without any injury to uvula ,anterior pillar , posterior pillar and tonsillar bed .

1.Snoring Scores as Reported by Patient

The questionnaire is given to subject to score his or her probability of falling asleep on a scale of increasing probability from 0 to 3 for eight different situations as per **Epworth Sleepiness scale** .

The Sum of 8 item –score is the Total ESS score (Range 0-24).

Higher the score ,indicates increased daytime sleepinesss

0–9 range - normal

11-15- mild to moderate sleep apnea,

16 and above - severe sleep apnea or narcoleps

2.VAS (Visual Analogue Scales) Scores

Day1

day 3

day 5

3.Post operative bleeding

4.Speaking

5.Return to normal swallowing

IV.Description of Coblation Assisted Resection of Benign Laryngeal Lesions .

About 20 patients diagnosed as Benign Laryngeal Lesion (Laryngeal papilloma,Ventricular Cyst, Vallecular cyst, epiglottic cyst) were randomly selected between age group between 10- 45 years .

Clinical history , clinical Examination explained above were done and finding documented .

Indirect Laryngoscopy and Videolaryngoscopy were done and findings documented .

After explaining the procedure and its complications to the patients and obtaining written consent and fitness for Anaesthesia, the procedure is undertaken.

Fig 22 showing Boyce's position and introduction of Direct laryngoscopy .

The procedure is undertaken under general anaesthesia with the patient placed in supine position with orotracheal intubation using MLE tube.

Patient is placed in Boyce's position and Mouth opened wide using Kleinsausar's Direct Laryngoscope with Chest suspension .

The following structures are visualised successively ;

1.Uvula

2.Epiglottis

3.Arytenoids and Aryepiglottic fold

4.Vestibular folds

5.Vocal cords and Anterior commissure

Now the Direct laryngoscope is fixed when the laryngeal lesions are Visualised completely and MLE tube is pushed posteriorly.

The surgeon is seated on the cranial side of the patient .

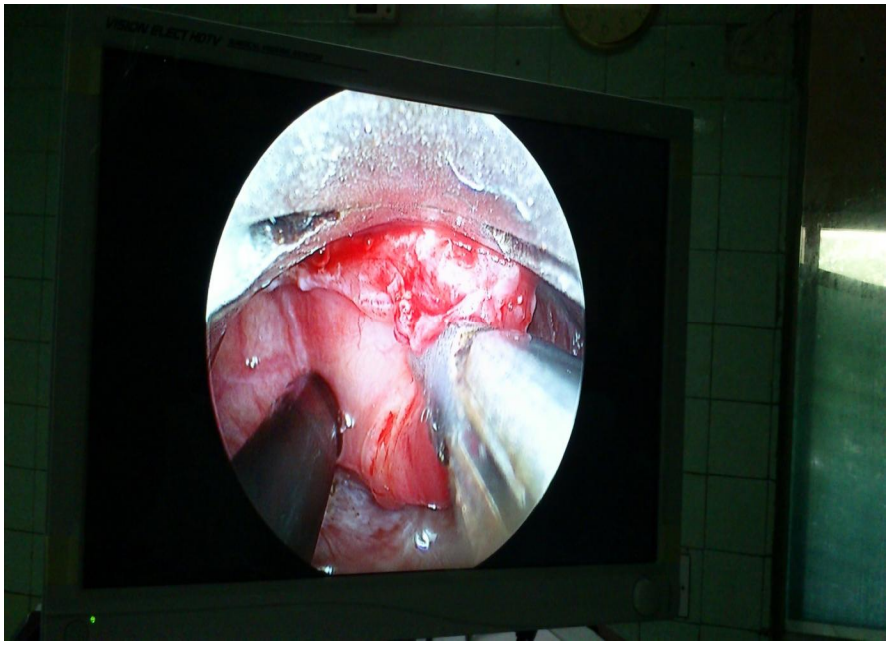


Fig 23 showing Dissection of laryngeal papilloma using coblation.

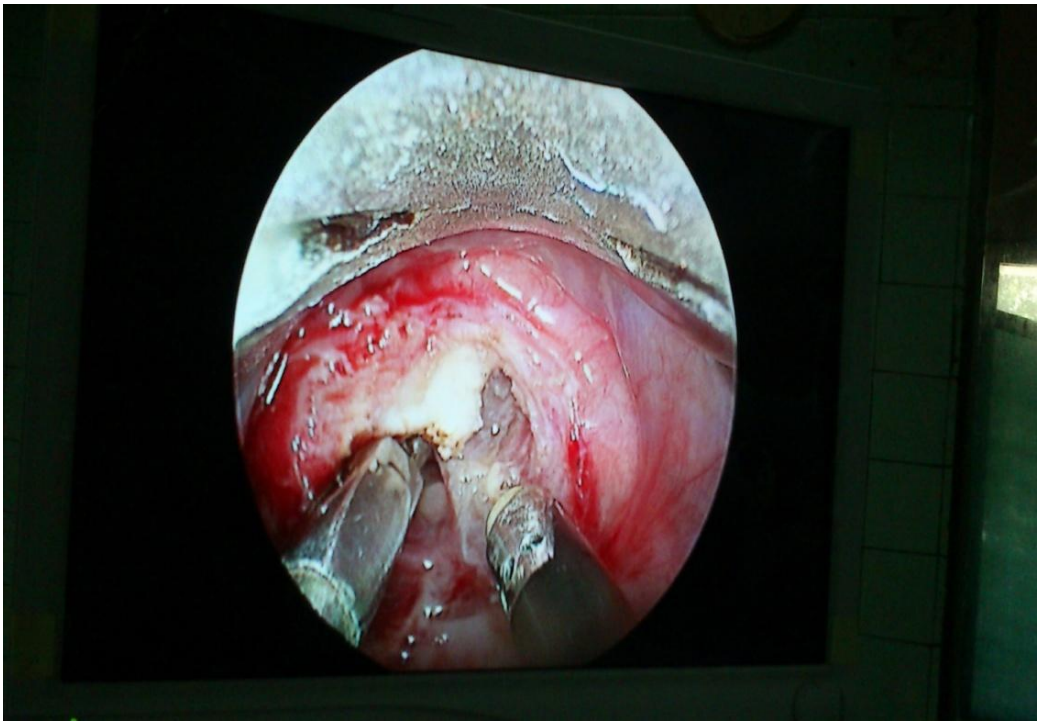


Fig 24 showing Dissection of laryngeal papilloma using coblation.

Now, the Larnygeal Coblator Wand is introduced transorally after setting 5 ; 3 . 5 – Coblation and 3 - coagulation , Saline irrigation and suction apparatus is connected with the tubing .

Adrenaline soaked cotton balls are placed over the laryngeal lesions for about few minutes.

The Laryngeal papilloma is held medially using laryngeal Cup forceps, Incision is between the mucosa over the Vestibular fold and Papilloma.

Gently the tissue is coblated and separated from the laryngeal lesions and during the coblation ,due to continous saline irrigation and suctioning ,fear of inhalation fumes is avoided.

LASER endotracheal tube is not required because the risk of fire is absent .

About 2 cases of epiglottic cyst were coblated from its base completely.

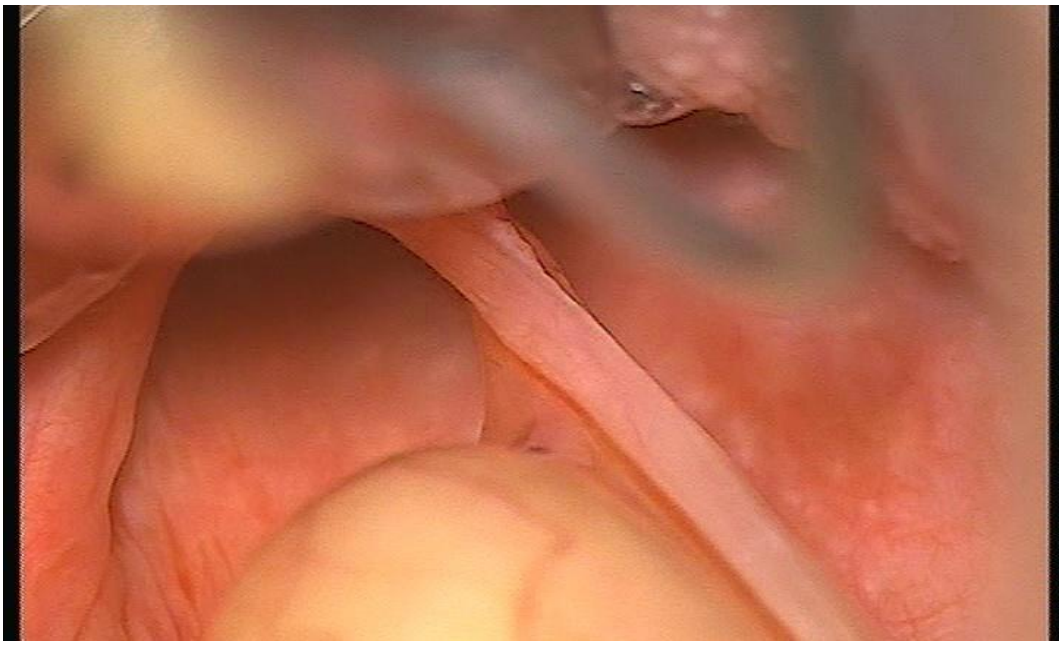


Fig 25 showing Attachment of Eiglottic cyst with its base.

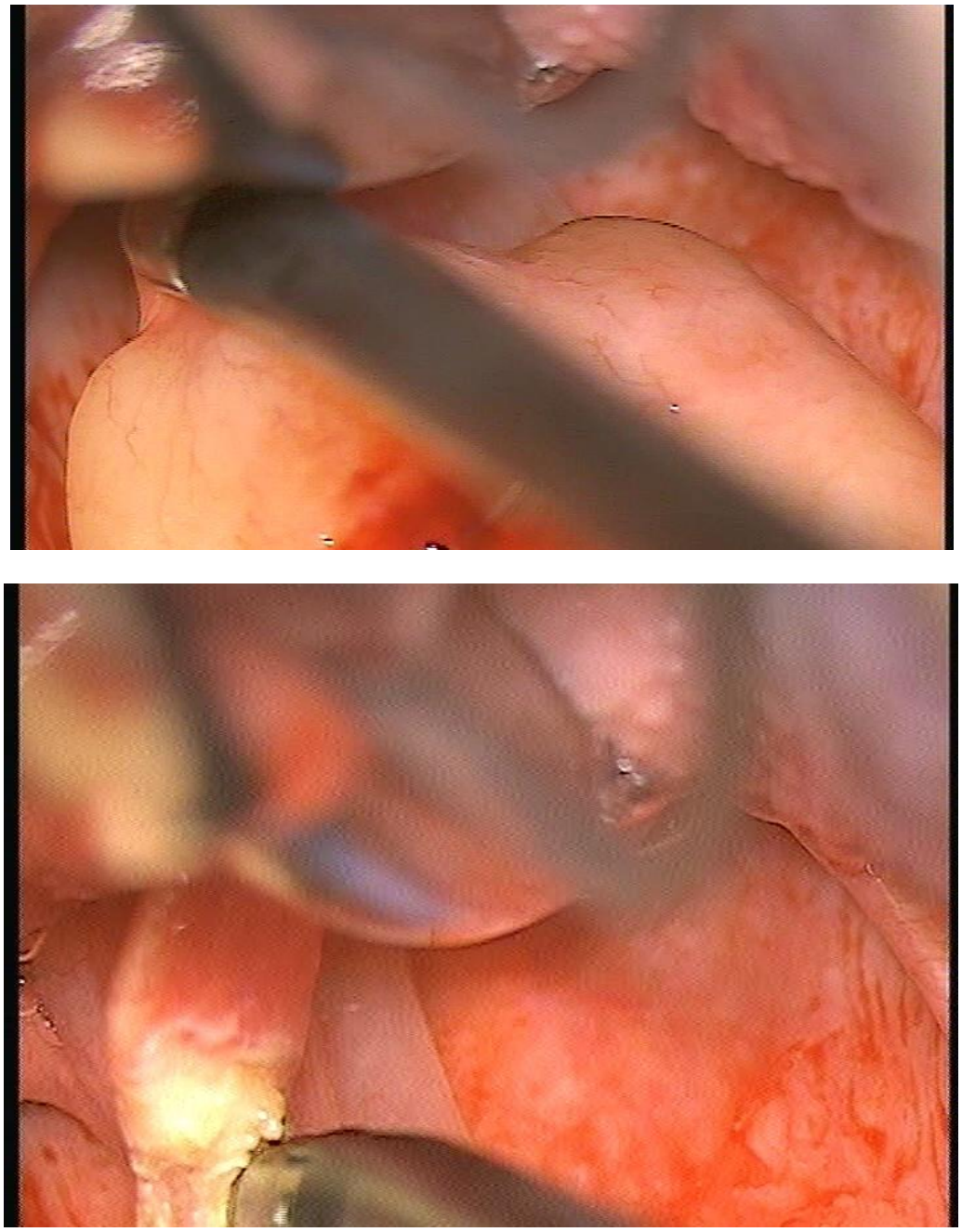


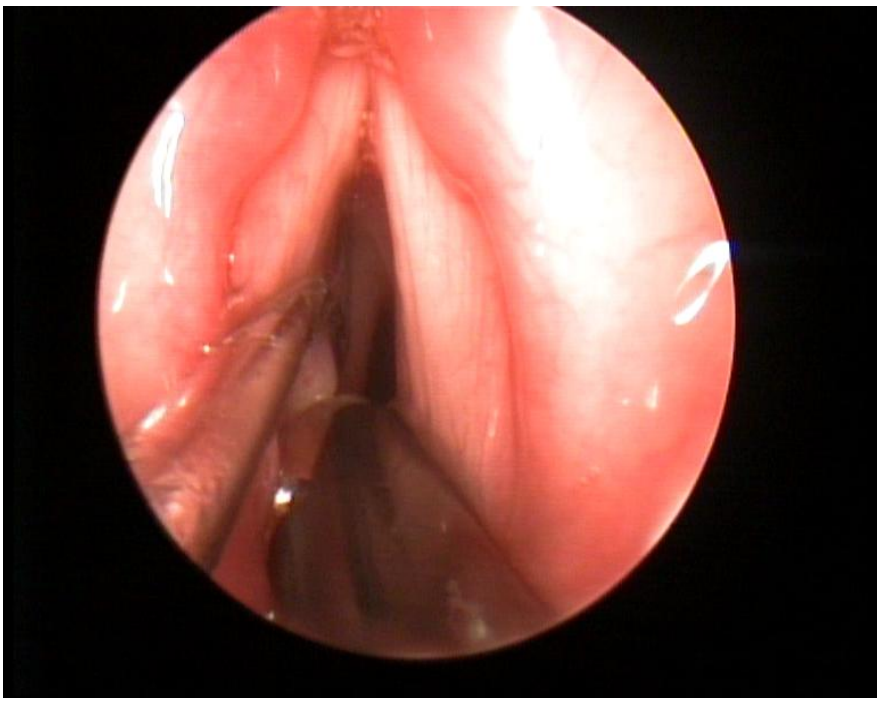
Fig 26,27 showing Attachment of Eiglottic cyst with its base being coblated using laryngeal wand .

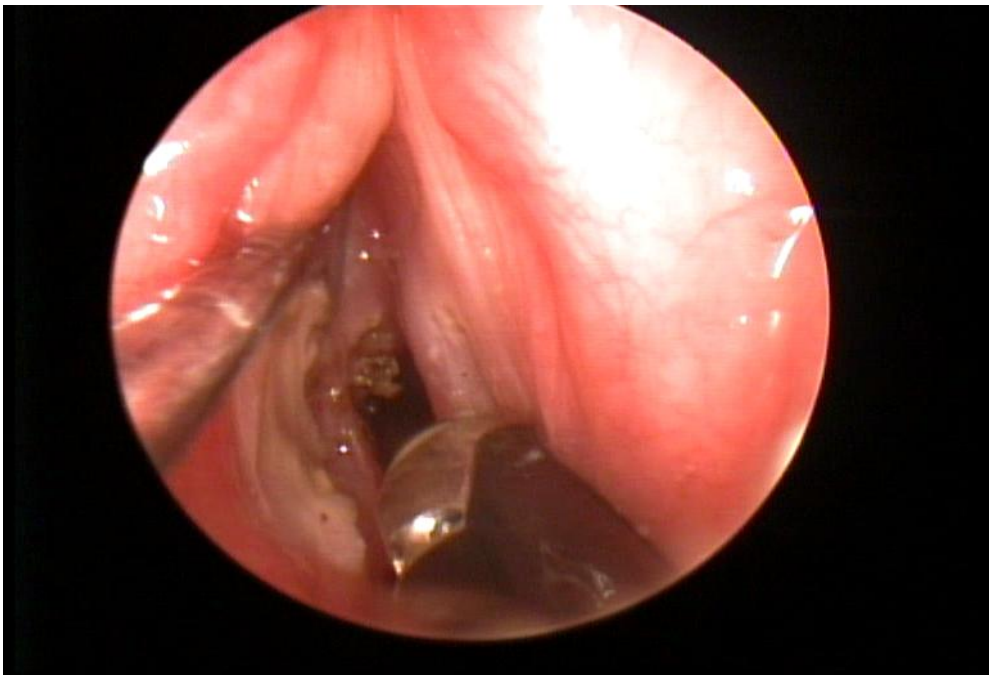
The Base of the laryngeal lesion is completely coblated , without leaving any gross remnant lesion and if any bleeding points are present immediately cauterised and making sure of minimal damage to the adjacent healthy mucosa .

Dennis Kashima procedure using Coblation

About 4 patients diagnosed with Bilateral Abductor palsy , Underwent Dennis Kashima procedure , which involves resection of unilateral Posterior cordectomy.

Out of 4 , 2 patients were post total thyroidectomy and other 2 were idiopathic causes , who underwent Emergency tracheostomy .





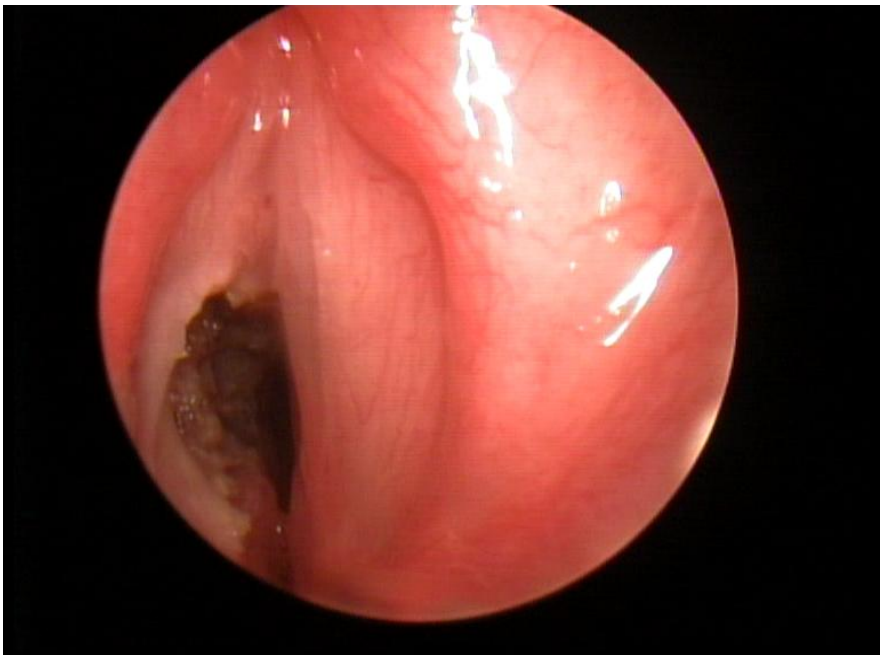


Fig 28,29,30 showing posterior cordotomy being done using coblator Laryngeal wand .

The procedure is undertaken under general anaesthesia through the Tracheostomy tube with the patient placed in supine position .

Patient is placed in Boyce's position and Mouth opened wide using Kleinsausar's Direct Laryngoscope with Chest suspension .

The following structures are visualised successively ;

1.Uvula

2.Epiglottis

3.Arytenoids and Aryepiglottic fold

4.Vestibular folds

.Vocal cords and Anterior commissure

Now the Direct laryngoscope is fixed when both vocal cords are visualised completely and MLE tube is pushed posteriorly.

Now, the Laryngeal Coblator Wand is introduced transorally after setting 5 ; 3 .5 – Coblation and 3- coagulation, Saline irrigation and suction apparatus is connected with the tubing .

Adrenaline soaked cotton balls are placed below in the subglottic region.

Either of the cord is selected and using coblator wand the posterior 1/3rd of the vocal cord is resected laterally upto vocalis muscle plane posteriorly upto the vocal process and anteriorly upto the mid 1/3rd of the vocal cord and if any bleeding points are present immediately cauterised and making sure of minimal damage to the adjacent healthy mucosa .

Post operative evaluation

1.Intraoperative bleeding

2.Pain score (Day 1,3,5)

3.Days reporting pain

4.Liquid diet days

5.Post operative haemorrhage

Patient was decannulated on Day 2, after 24 hours of tolerating spigotting .

RESULTS AND OBSERVATION

RESULTS AND OBSERVATION

Chi square test – The chi square test for independence is used to determine the relationship between two variable of a sample. Independence means that the two factors are not related .

Random sampling – a random sampling of the data from a fixed distribution or population

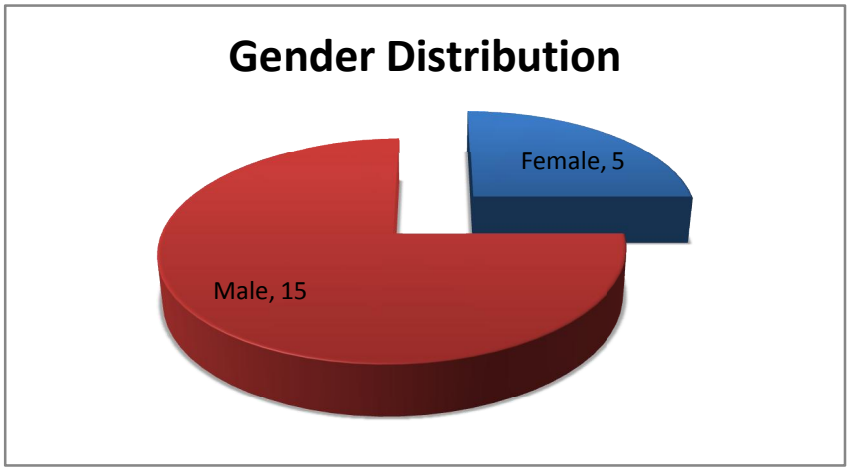
Fisher Exact test – The Fisher Exact test looks at a contigeny table which displays how different interventions have produced different outcomes. Its null hypothesis is that intervention do not affect the outcomes – that the two are independent. P- value significant if less than 0.05

Statistical software – The statistical software used are namely – SAS9.2, SPSS Systat 12.0 . Graphs ,bar charts and tables were done using Microsoft Excel.

In this study, following Coblation assisted Adenoidectomy ,patient was treated with IV antibiotics, analgesics and liquid fluids were started initially and then gradually oral soft diet was given.

In this study, 20 randomly selected patients, diagnosed Chronic Adenoid Hypertrophy, who underwent Coblation Assisted Adenoidectomy.

The following results were obtained



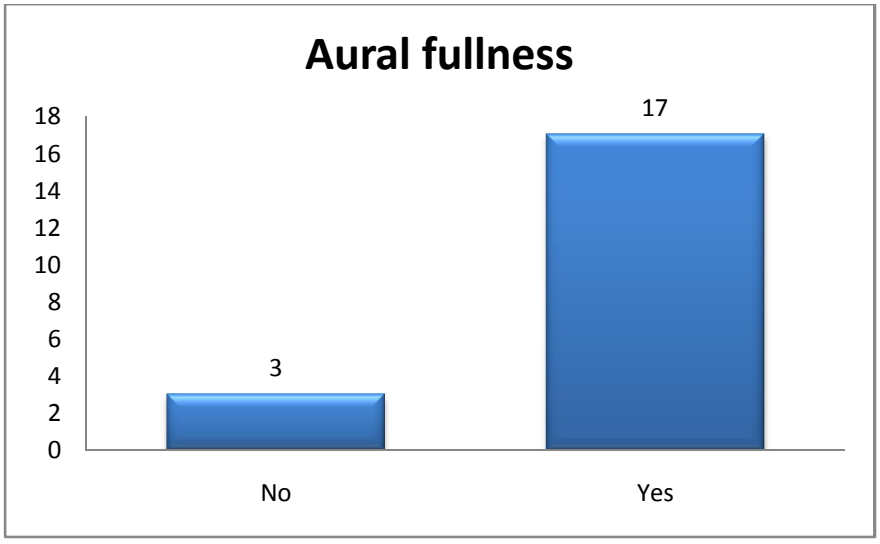
Ratio of Male : Female - 3:1

Cumulative percent was 75 and 25 percent for male and female respectively.

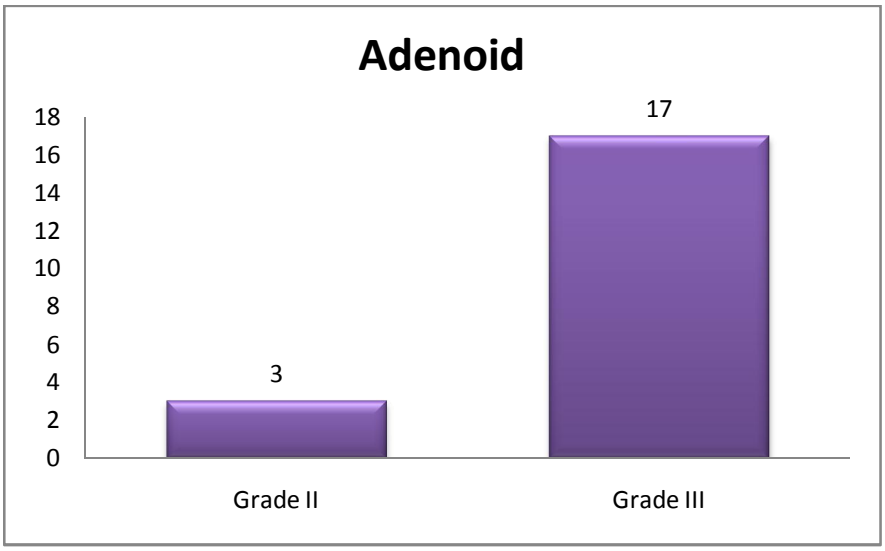
		sex		Total
		female	male	
Adenoid	Grade II	1	2	3
	Grade III	4	13	17
Total		5	15	20

	Value	df	Asymp.Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	.131[a]	1	.718	
Continuity Correction[b]	0.000	1	1.000	
Likelihood Ratio	.124	1	.725	
Fisher's Exact Test				1.000
No. of Valid Cases	20			

Since the p value is greater than 0.05 ,it is not significant.

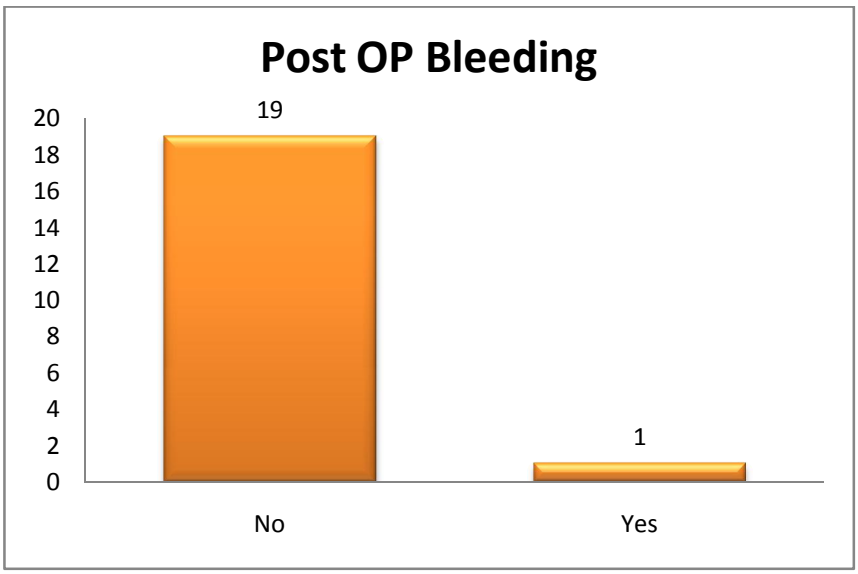


In this study ,about 17 patients out of 20 patients presented with Aural fullness, 3 patients did not have ear complaints.



In this study ,about 17 patients out of 20 patients presented with Grade 3 Adenoid Hypertrophy , 3 patients had Grade 2 Adenoid hypertrophy.

Valid percent was 15and 85 percent for Grade I and II Adenoid hypertrophy respectively.



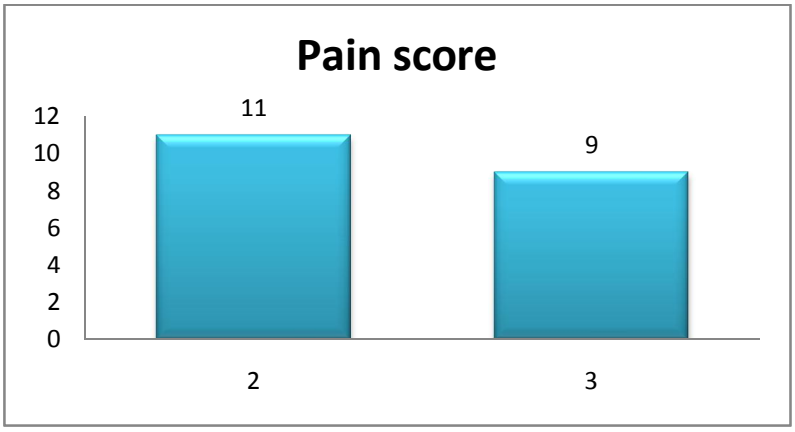
In this study ,about 19 patients out of 20 patients had no post operative bleeding , only 1 patients had post operative bleed which was managed with post Nasal packing and Blood transfusion ,who recovered after 2 days .

About 95 percent was patient had no significant post operative bleeding. Rest 5 percent had post operative bleed which was managed with post Nasal packing and Blood transfusion

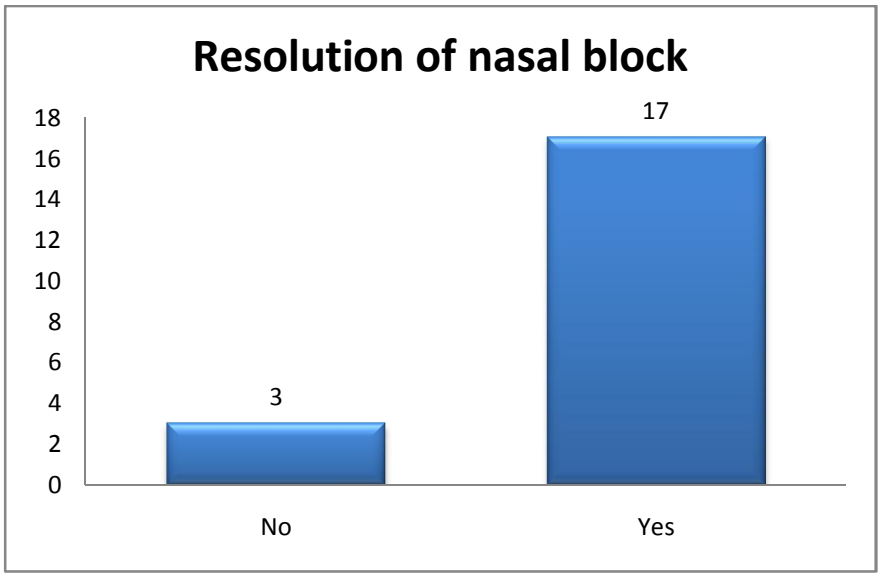
		Sex		
		Female	Male	Total
Post op bleeding	No	4	15	19
	yes	1	0	1
Total		5	15	20

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	3.158[a]	1	.076	
Continuity Correction[b]	.351	1	.554	
Likelihood Ratio	2.937	1	.087	
Fisher's Exact Test				.250
N of Valid Cases	20			

Since the p value is greater than 0.05 ,it is not significant.



In this study ,about 11 patients out of 20 patients had VAS score of 2 out of 10 and rest of the 9 patients had VAS score of 3 out of 10.



In this study, about 17patients out of 20 patients had complete resolution of Nasal symptoms , only 3 patients had incomplete

resolution of nasal block as these patients also had associated mild septal deviation.

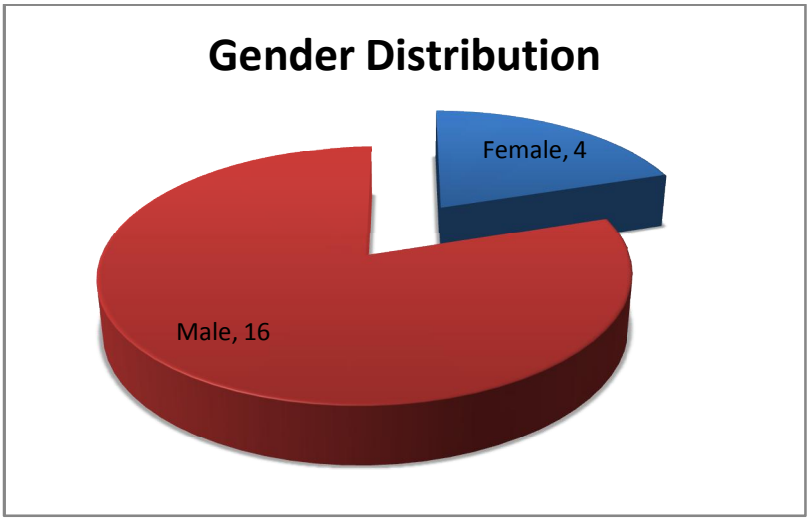
About 85 percent was patient had significant resolution of Nasal Obstruction and rest of the 15 percent had partial reduction of the Symptom.

		Sex		
		Female	Male	Total
Resolution of nasal block	No	1	2	3
	Yes	4	13	17
Total		5	15	20

	Value	df	Asymp.Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	.131[a]	1	.718	
Continuity Correction[b]	0.000	1	1.000	
Likelihood Ratio	.124	1	.725	
Fisher's Exact Test				1.000
N of Valid Cases	20			

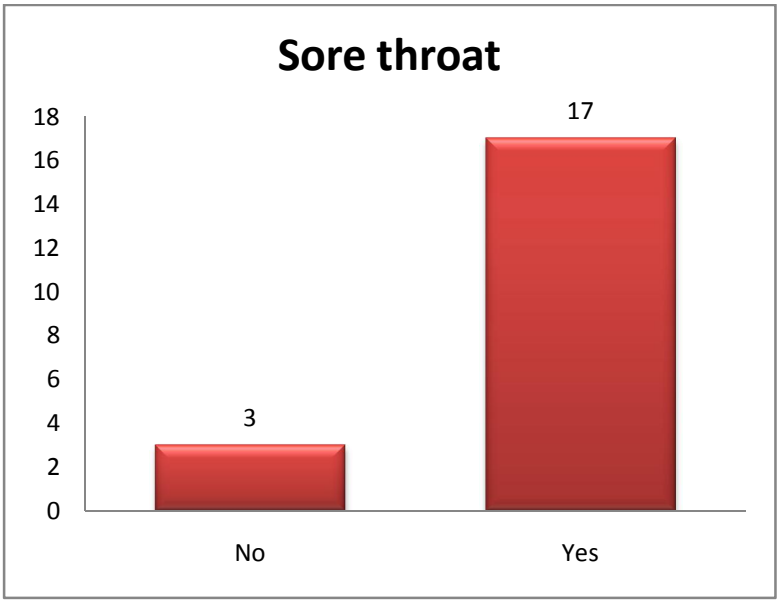
Since the p value is greater than 0.05 ,it is not significant.

Coblation Assisted Tonsillectomy

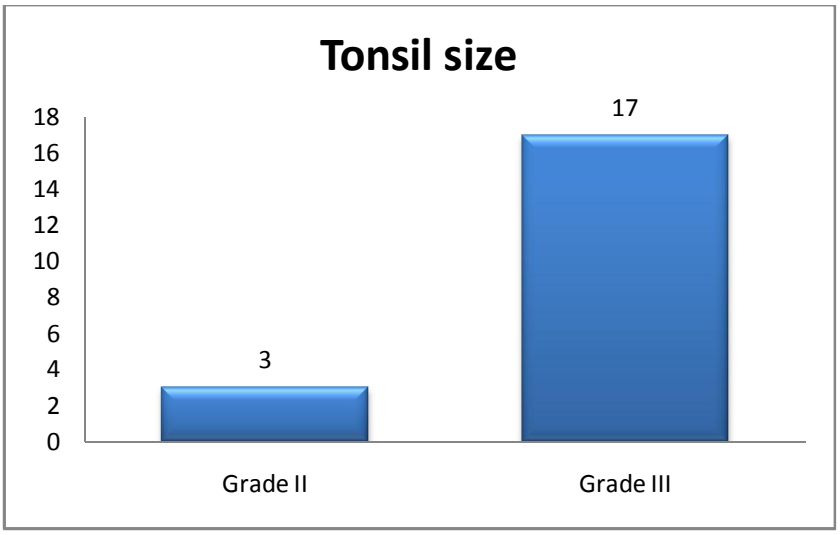


Ratio of Male : Female - 4:1

Cumulative percent was 80 and 20 percent for male and female respectively.



In this study, about 17 patients out of 20 patients presented with Sore throat, 3 patients presented mainly with complaints of difficulty in swallowing .



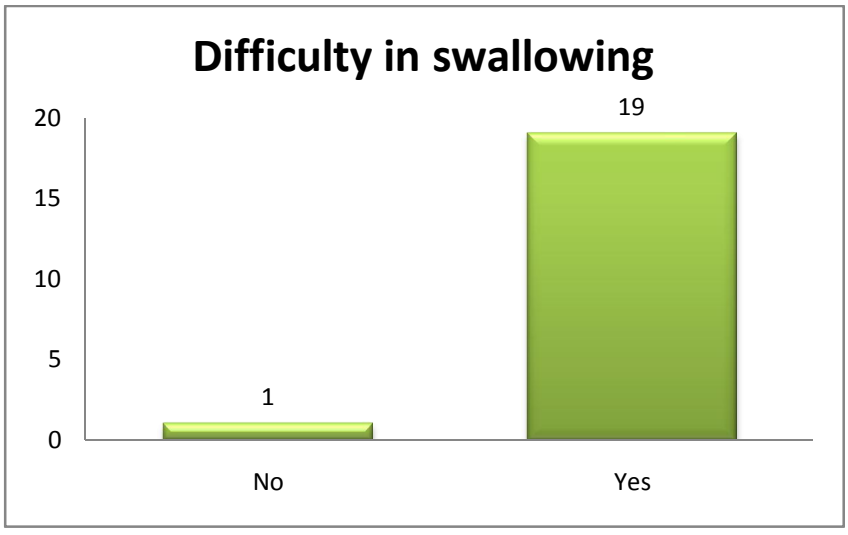
In this study ,about 17 patients out of 20 patients presented with Grade 3 Tonsillar Hypertrophy , 3 patients had Grade 2 Tonsillar hypertrophy.

Valid percent was15and 85 percent for Grade II and III Tonsillar hypertrophy respectively.

		Sex		
		female	male	Total
Tonsil size	Grade II	2	1	3
	Grade III	2	15	17
Total		4	16	20

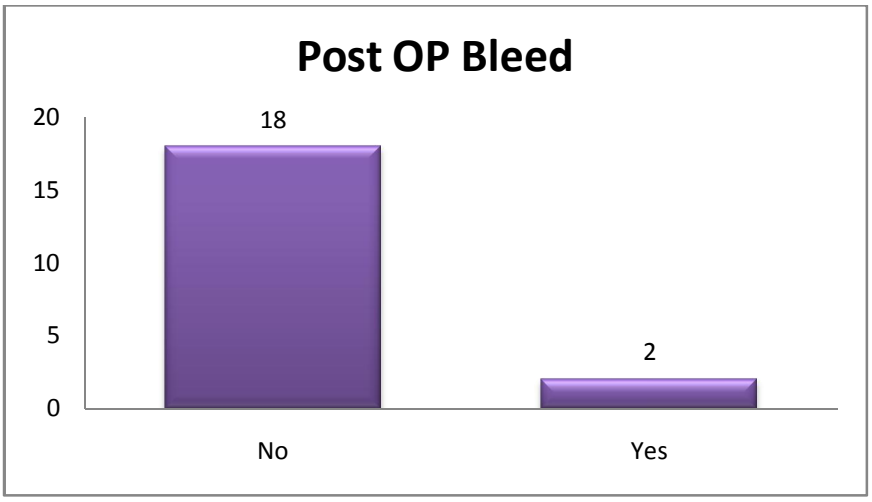
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.804[a]	1	.028		
Continuity Correction[b]	1.985	1	.159		
Likelihood Ratio	3.882	1	.049		
Fisher's Exact Test				.088	.088
N of Valid Cases	20				

Since the p value is less than 0.05 it is Significant



In this study ,about 19 patients out of 20 patients presented with difficulty in swallowing .

About 95 percent presented with complaints of difficulty in swallowing.



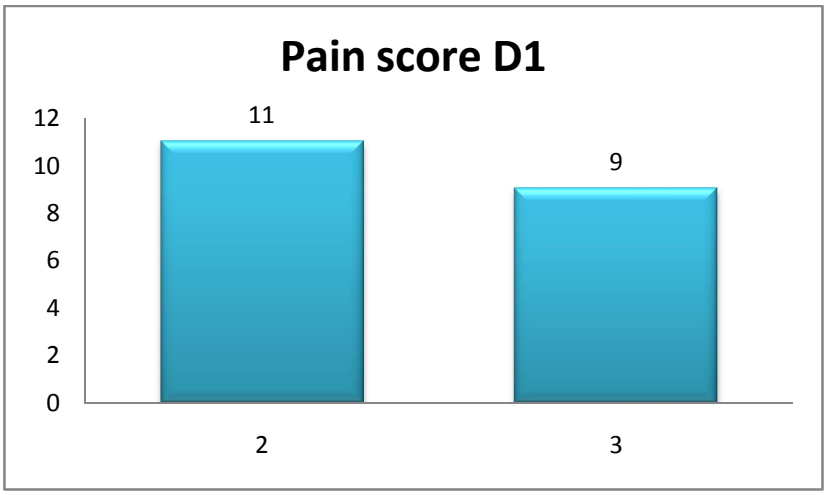
In this study, about 18 patients out of 20 patients had no post operative bleed , only 2 patients had post operative bleed which was managed with IV antibiotics and Blood transfusion ,who recovered after 2 days.

About 93 percent had no post op bleeding only about 7 percent had bleed which is significant .

		Sex		
		female	male	Total
Post op bleed	No	3	15	18
	Yes	1	1	2
Total		4	16	20

	Value	df	Asymp. Sig. 2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	1.250[a]	1	.264	
Continuity Correction[b]	.035	1	.852	
Likelihood Ratio	1.023	1	.312	
Fisher's Exact Test				.368
N of Valid Cases	20			

Since the p value is greater 0.05 ,it is not significant.



In this study, about 11 patients out of 20 patients had VAS score of 2 out of 10 and rest of the 9 patients had VAS score of 3 out of 10.

Over all on the average pain score was about 2.4

		Sex		
		female	male	Total
Pain score D1	2	3	8	11
	3	1	8	9
Total		4	16	20

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	.808[a]	1	.369	
Continuity Correction[b]	.114	1	.736	
Likelihood Ratio	.846	1	.358	
Fisher's Exact Test				.591
N of Valid Cases	20			

In this study, about 14 patients out of 20 patients had returned to normal diet with minimal throat discomfort on post operative Day 3.

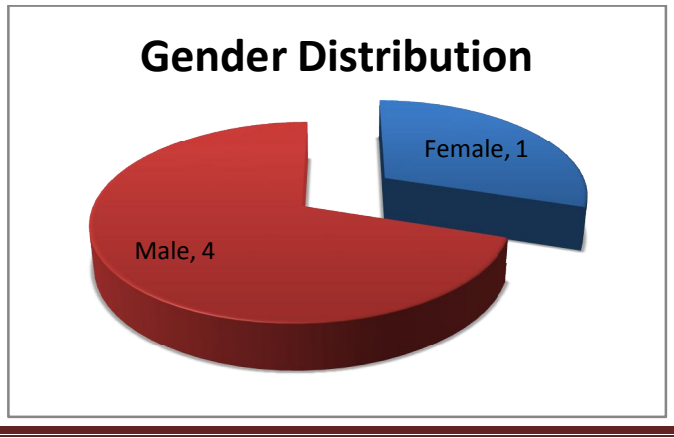
Rest of the 6 patients had returned to normal diet on post operative Day 4. About 70 percent of patient s returned to normal diet on Day 3.

Descriptives

Descriptive Statistics

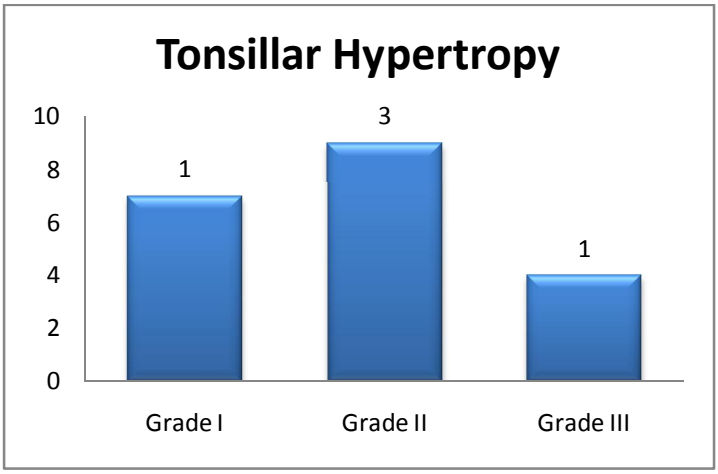
	N	Mean	Std. Deviation
Age	20	13.20	2.093
Time taken(mins)	20	21.80	3.488
Intra op bleed (ml)	20	12.80	3.286
Valid N (listwise)	20		

Snoring



Ratio of Male : Female - 4:1

Cumulative percent was 80 and 20 percent for male and female respectively.



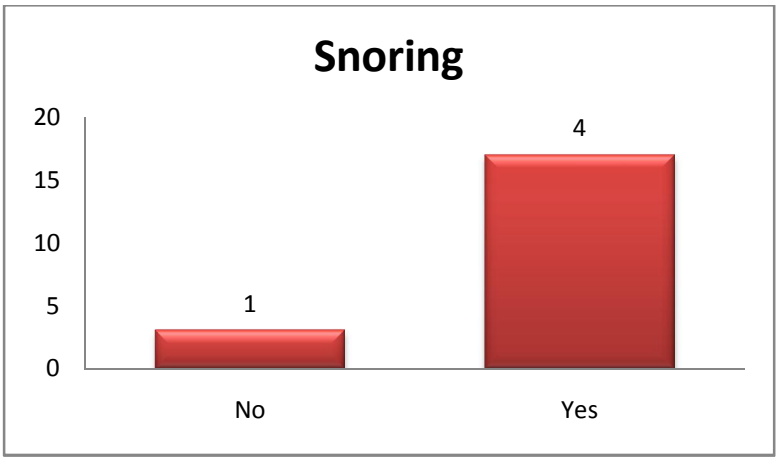
In this study, about 3 patients out of 5 patients presented with Grade II Tonsillar Hypertrophy, 1 patient each had Grade I and III Tonsillar hypertrophy respectively.

Valid percent was 20, 60, 20 percent for Grade I, II and III Tonsillar hypertrophy respectively

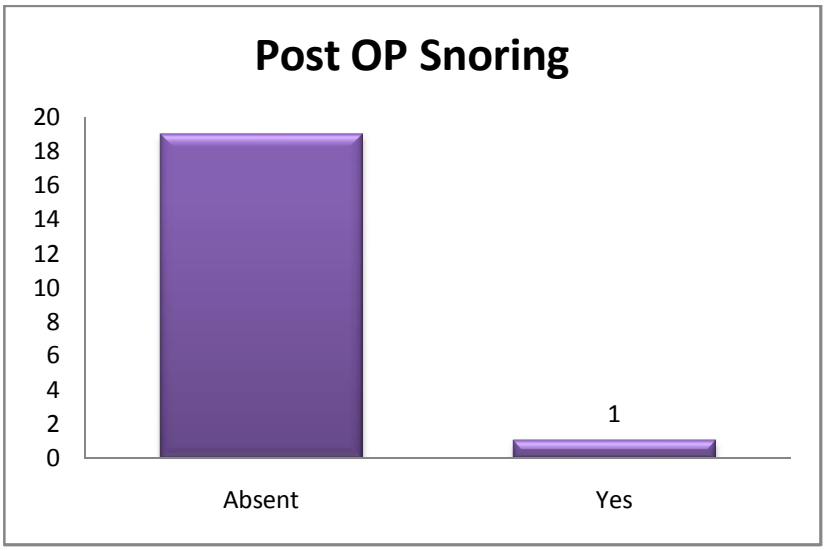
		female	male
Tonsillar hypertropy	Grade I	3	4
	Grade II	2	7
	Grade III	1	3
Total		6	14

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.858[a]	2	.651
Likelihood Ratio	.840	2	.657
N of Valid Cases	20		



In this study, about 4 patients out of 5 patients presented with complaints of snoring, only 1 patient presented with Increased day time sleepiness.

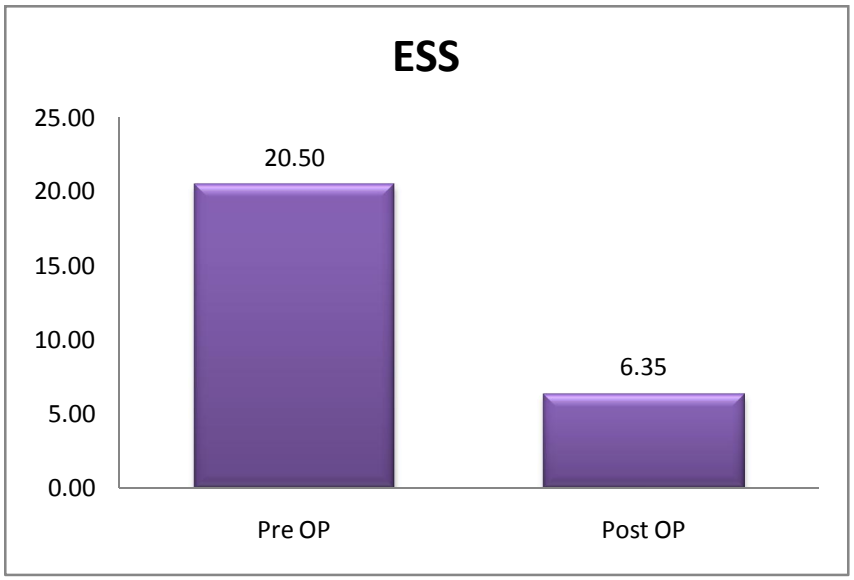


In this study, about 4 patients out of 5 patients had complete resolution of symptom of snoring, only 1 patient had minimal snoring.

About 80 -90 percent was patient had significant resolution of snoring. Rest 10-20 percent, had only partial reduction in the symptom due to multilevel obstruction.

		Sex		
		female	male	Total
snoring	No	0	3	3
	Yes	6	11	17
Total		6	14	20

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	1.513[a]	1	.219	
Continuity Correction[b]	.299	1	.585	
Likelihood Ratio	2.360	1	.124	
Fisher's Exact Test				.521



Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	20	28	47	37.40	5.960

T-Test

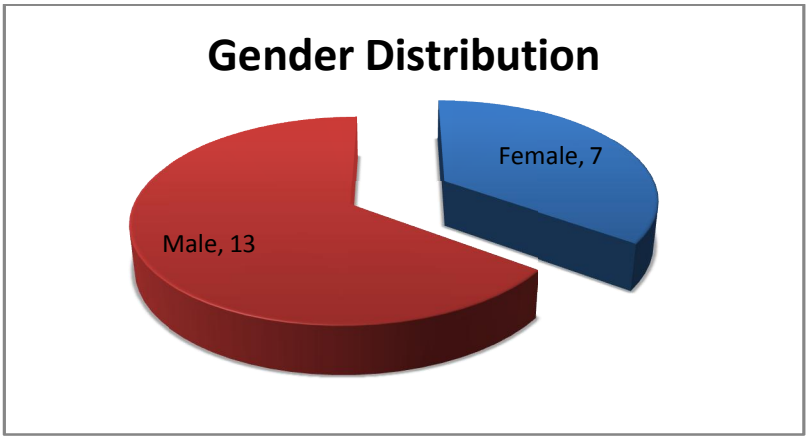
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean	ESS	
Pair 1	ESS pre op	20.50	20	2.164	.484	Pre OP	20.50
	ESS post op	6.35	20	1.843	.412	Post OP	6.35

Paired Samples Test

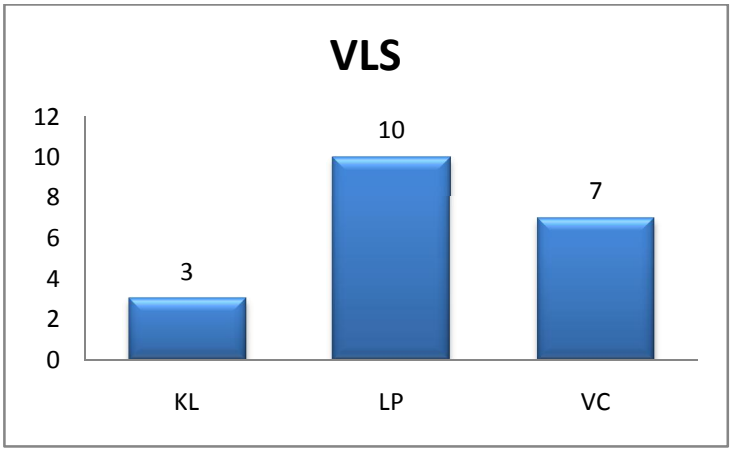
		Pair 1
		ESS pre op - ESS post op
Paired Differences	Mean	14.150
	Std. Deviation	2.870
	Std. Error Mean	.642
	95% Confidence Interval of the Difference Lower	12.807
	95% Confidence Interval of the Difference Upper	15.493

IV Coblation Assisted Excision of Benign laryngeal lesion



Ratio of Male : Female - 1.8:1

Cumulative percent was 65 and 35 percent for male and female respectively.



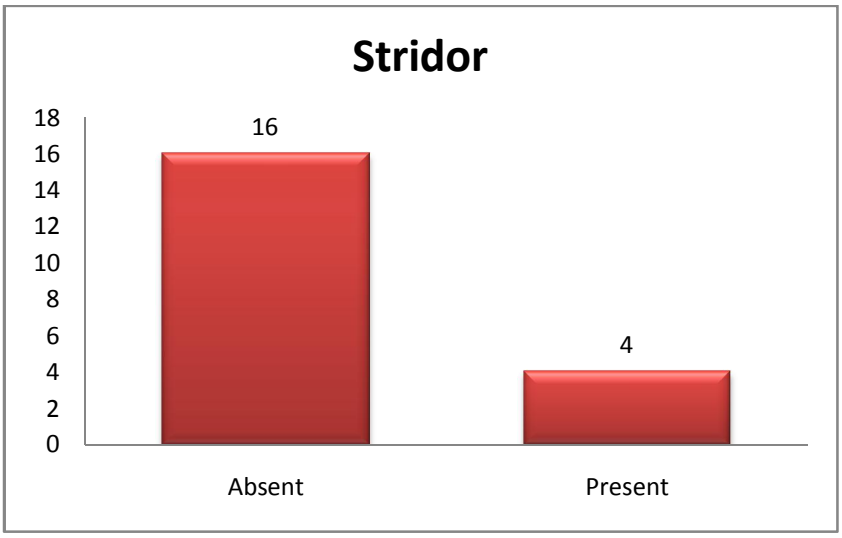
In this study, about 10 patients out of 20 patients were diagnosed with Laryngeal papillomatosis , 7 patients were diagnosed Ventricular cyst and 3 were Keratosis of vocal cord.

Valid percent was 35, 50, 15 percent for Keratosis, Laryngeal papillomatosis and Ventricular cyst respectively.

		Sex		
		female	male	Total
snoring	No	0	3	3
	Yes	6	11	17
Total		6	14	20

	Value	df	Asymp.Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	1.513[a]	1	.219	
Continuity Correction[b]	.299	1	.585	
Likelihood Ratio	2.360	1	.124	
Fisher's Exact Test				.521

Since p-value is greater 0.05 ,it is not significant.



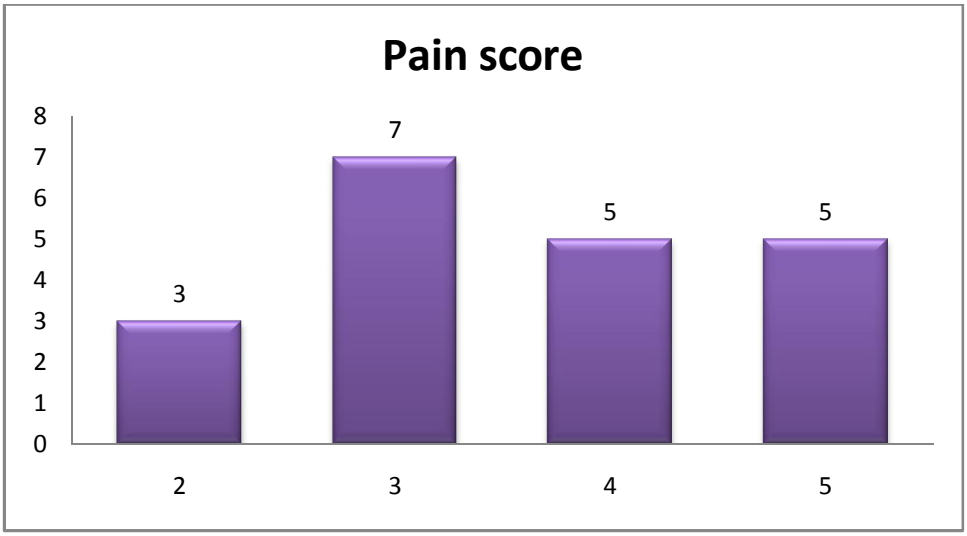
In this study, about 16 patients out of 20 patients had localised disease, glottis chink was adequate and were not in stridor and rest of the 4 patients were in stridor who required elective Tracheostomy.

On the average of about 80 percent did not require Tracheostomy and 20 percent required .

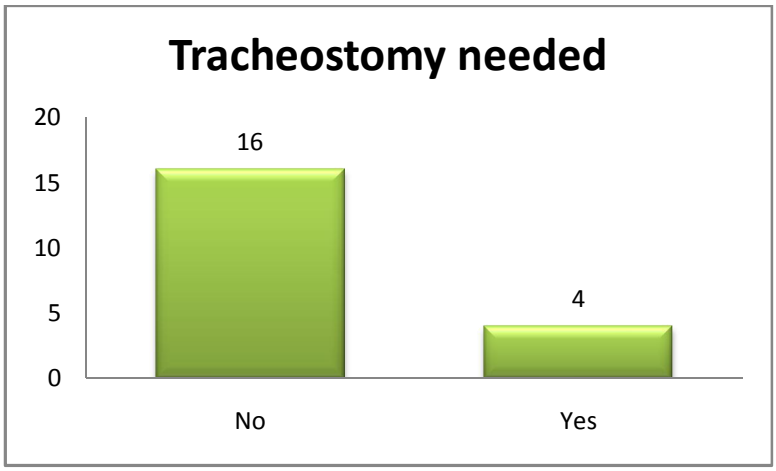
		Sex		
		Female	Male	Total
stridor	Absent	4	12	16
	Present	3	1	4
Total		7	13	20

Chi-Square Tests

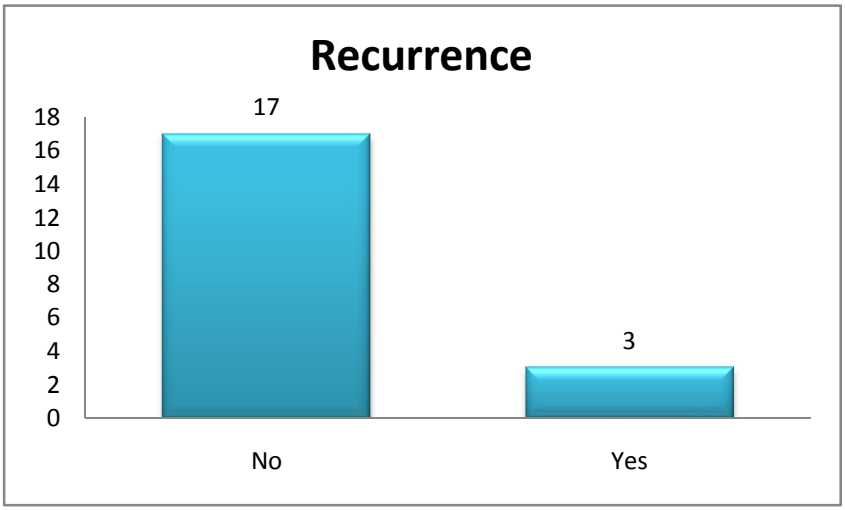
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.516[a]	1	.061		
Continuity Correction[b]	1.662	1	.197		
Likelihood Ratio	3.404	1	.065		
Fisher's Exact Test				.101	.101
N of Valid Cases	20				



In this study ,about 10 patients out of 20 patients had VAS score of 3 and below and rest of the patients had VAS score of 5. About 50 percent of the patients had VAS score of less than 4.



In this study, about 16 patients out of 20 patients had localised disease, glottis chink was adequate and were not in stridor and rest of the 4 patients were in stridor who required elective tracheostomy



In this study, about 17 patients out of 20 patients had no disease recurrence during the study period of 2 years and rest 3 patients diagnosed laryngeal papillomatosis, had recurrence who were treated with revision surgery with coblation .

About 85 percent had no significant recurrence of the disease, Three out of the 10 patients of laryngeal papillomatosis patient had Local recurrence of the disease and required revision surgery.

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
Age	20	30.75	9.547
Blood loss in ml	20	12.70	2.430
Valid N (listwise)	20		

DISCUSSION

DISCUSSION

A cross sectional descriptive study was conducted from a period of February 2013 to September 2014 in our department of Otorhinolaryngology.

In this study, 40 randomly selected patients, diagnosed Chronic Adenotonsillitis, underwent Coblation Assisted AdenoTonsillectomy ,

Subjects who had past history co morbid illness like diabetes mellitus, hypertension, ischemic heart disease, pulmonary tuberculosis, obesity, malignancy,bleeding disorder were excluded from the study.

In this study all subjects were in the age group between 10 to 45 years. None had significant past or family history .

In our study ,Cumulative percent was 75 and 25 percent for male and female respectively. Valid percent was 15 and 85 percent for Grade II and III Tonsillar hypertrophy respectively. About 70 percent of patient s returned to normal diet on Day 3.About 93 percent was patient had no significant post operative bleeding .Rest 7 percent

had post operative bleed .Over all on the average pain score was about 2.4.

The coblation tonsillectomy took on an average of 32 minutes. The study protocol was approved by the UCLA Institutional Review Board.

Children ages 2 to 16 years undergoing outpatient adenotonsillectomy were offered participation in this prospective trial. Postoperative outcome measures included postoperative pain, time taken In conclusion, the overall advantages of Coblation adenoidectomy, are the decrease in intra- and post-operative bleeding, better safety, precision of adenoid removal and less injury to adjacent tissues.

Shah et al (27) National Prospective Tonsillectomy Audit study showed. Mean pain level on postoperative day (POD) 1 based on a visual analogue scale of 1 to 10. Average pain score was 3 in their study The coblation tonsillectomy took on an average of 20-24 minutes.

The studies have shown that the standard operation with blood vessels tied off was most likely to result in someone needing more surgery because of bleeding in the first 24 hours

A recent national audit (called the National Prospective Tonsillectomy Audit) collected information concluded that coblation almost 1 in 100 patients had reactionary haemorrhage due to coblation.

Chang et al study(30) done in 2004 showed in children mean pain score was 2 post coblation tonsillectomy percentage of children return back to normal diet was 80% by D4 post coblation tonsillectomy.

Stoker et al(27), 2004 performed similar study

Snoring

In this study, 5 randomly selected patients, diagnosed Mild Obstructive sleep Apnea syndrome , underwent Coblation Assisted uvulopalatopharyngoplasty .

Subjects who had past history co morbid illness like diabetes mellitus, hypertension, ischemic heart disease, pulmonary tuberculosis, obesity, malignancy, bleeding disorder were excluded from the study.

Cumulative percent was 80 and 20 percent for male and female respectively.

About 80 percent had history of significant snoring ,rest of 20 percent presented with increased day time sleepiness.

About 80 -90 percent was patient had significant resolution of snoring .

Rest 10-20 percent , had only partial reduction in the symptom due to multilevel obstruction.ESS score from 20 it decreased to 6. In 1997, Finkelstein and et al(57)studied in about 39 randomly selected patients, diagnosed as Mild Obstructive sleep apnea syndrome showed significant improvement ESS score from 18 it decreased to 7 and Symptomatic decrease in snoring .

In 2000, Madani. M and et al (58) studied in about 63 randomly selected patients, diagnosed as Mild Obstructive sleep apnea syndrome showed significant improvement ESS score and decrease in snoring

Rapid Recovery .

Benign laryngeal lesions

In this study, 20 randomly selected patients , diagnosed Benign laryngeal Lesions.Subjects who had past history co morbid illness like diabetes mellitus, hypertension, ischemic heart disease, pulmonary tuberculosis,obesity, malignancy, bleeding disorder were excluded from the study.

Valid percent was 35,50,15 percent for Keratosis, Laryngeal papillomatosis and Ventricular cyst respectively. On the average of about 80 percent did not require Tracheostomy and 20 percent required .About 85 percent had no significant recurrence of the disease, About 50 percent of the patients had VAS score of less than 4.Operation time 18 min . Blood loss was about 15 mL.

Three out of the 10 patients of laryngeal papillomatosis patient had Local recurrence of the disease and required revision surgery.

In 2011 , In china Qingfeng Zhang, DeLong Liu, Cuiping She (20) Studied 21 cases with laryngeal papilloma treated by Coblation.

Operation time 11 min . Blood loss was about 13 mL The follow-up was carried out from 1 to 3 years and 9 months and there were 4 cases of recurrence with the average recurrence interval of seven months In 2007 , Timms MS ,Bruce IA and et al (18)Studied 21 cases with Benign laryngeal lesion treated by Coblation. Operation time 20 min . Blood loss was about 24 mL

The follow-up was carried out from 1 to 3 years and had recurrence cases .

SUMMARY

SUMMARY

A cross sectional descriptive study was conducted from a period of February 2013 to September 2014 in our department of Otorhinolaryngology.

About 65 cases which were selected randomly, based on the inclusion and exclusion criteria, were sub divided based on the diagnosis .

Out of which 20 were Chronic Adenoid Hypertrophy, 20 were chronic Tonsillitis, 5 were mild Obstructive sleep apnea syndrome, 20 were Benign Laryngeal lesions.

Each of these, underwent their respective surgeries Coblation assisted Adenoidectomy ,Coblation Assisted Tonsillectomy ,Coblation Assissted Uvulopalatopharyngoplasty and Coblation assisted excision of Benign Laryngeal lesions Coblation Assisted Adenoidectomy ensures complete and safe removal of adenoid tissue ,decreased post operative pain ,Early return to normal diet Coblation Assisted Tonsillectomy ensures complete Extracapsular issection of tonsil decreased post operative pain ,Early return to normal diet .

The main advantages are:

i) Bleeding is minimal intra operatively and post operatively and which can be immediately coagulated in case of any active bleeding .

ii) Direct endoscopic visualisation ensures complete excision.

iii) Able to access all the areas due usage small tip used for dissection.

iv) Absent significant residual tissue.

v) fewer complications – injury to surrounding tissues.

vi) No age limitation

vii) requirement of post-operative drug consumption is decreased

viii) a reduction in the loss of academic performance due to faster post-surgical healing .

The main disadvantages are

1.Cost of the Instrument and wand

2. Single Use Wand

3 .Separate Wand for each surgery - Tonsillar wand ,Laryngeal wand .

4.Time taken for surgical dissection is more .

5.Post operative bleed is about 6-8 percent .

6.Nasal decongestion is required for Coblation assisted Adenoidectomy

CONCLUSION

CONCLUSION

In this study ,about 65 cases were selected randomly, Out of which 20 were Chronic Adenoid Hypertrophy ,underwent Coblation assisted Adenoidectomy ,20 were chronic Tonsillitis who underwent Coblation Assisted Tonsillectomy ,5 were mild Obstructive sleep apnea syndrome underwent Uvulopalatopharyngoplasty, 20 were Benign Laryngeal lesions who underwent Coblation assisted excision had complete excision of the lesions with safety , with minimal post operative pain,with minimal injury to the surrounding healthy tissue, intraoperative bleed, early recovery to normalcy.

About 3 out of 40 patients had post operative bleeding, following Coblation Assisted Adenotonsillectomy, Time consuming ,requires expertise and less cost effective

However , the sample size is too small to come to definitive conclusion.

ANNEXURES

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A. BIBILOGRAPHY

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B. PROFORMA

B. PROFORMA

Name ; Age /sex : I.P.no :

D.O.A:

D.O.S

D.O.D:

Address :

CHIEF COMPLAINTS

THROAT PAIN

DIFFICULTY IN SWALLOWING

SNORING

MOUTH BREATHING

ANY OTHER ASSOCIATED SYMPTOMS

HOARSENESS OF VOICE

INSOMNIA

INCREASED DAY TIME SLEEPINESS

HISTORY OF PRESENT ILLNESS :

Complete detailed description of each symptoms, aggravating and relieving factors, Associated symptoms.

Negative history

PAST HISTORY :

Any H/O DM /Epilepsy /HTN /PTB /Drug allergy /bleeding diathesis /Cardiac disease /Asthmatic

Chronic Drug use /any other medical comorbidities .

FAMILY HISTORY

PERSONAL HISTORY

Diet

Bladder and bowel habits

Addiction .

GENERAL PHYSICAL EXAMINATION

Built , mental status .

Pallor Icterus Cyanosis Clubbing Pedal edema

General Lymphadenopathy .

VITALS

Pulse Rate :

Blood Pressure:

Respiratory Rate:

Saturation :

Jugular Venous Pressure :

SYSTEMIC EXAMINATION

Cardio Vascular System:

Respiratory System;

Per Abdomen:

Central Nervous System:

ENT EXAMINATION

ORAL CAVITY AND OROPHARYNX EXAMINATION

Lips, teeth, gums, buccal mucosa, Buccogingival sulcus , Retro Molar Trigone , hard palate, Anterior 2/3 rd tongue , floor of mouth, Anterior pillar, tonsils, soft palate, uvula, posterior pillar, posterior Pharyngeal wall.

Indirect Laryngoscopy –

Base of Tongue , Vallecula , Epiglottis , Aryepiglottic fold ,

Arytenoids, Vestibular bands, Vocal cords, Glottic chink, tracheal rings, pyriform fossa.

NOSE

External Nose

Vestibule

Anterior Rhinoscopy

	Right	Left
Inferior Meatus		
Inferior Turbinate		
Middle Meatus		
Middle turbinate		

Airway patency tests

	Right	Left
Cottle's test		
Cotton wool test		
Cold spatula test		

Post nasal Examination

EAR EXAMINATION

	Right	Left
External Ear		
External Auditory Meatus		
Tympanic Membrane		
TUNING FORK TESTS		
Facial Nerve Examination		

Diagnostic Nasal Endoscopy

Videolaryngoscopy

Investigations

Complete Blood Count

Renal Function Tests

Liver Function Tests

ELISA –HIV /HbsAg

Blood group and Rh typing

Bleeding Time /Clotting Time

Urine analysis

ECG

Chest x ray- PA view

X ray - Nasopharynx soft tissue lateral view

B. PROFORMA

6. ETHICAL COMMITTEE APPROVAL LETTER

E. INFORMED CONSENT FORM

C. ETHICAL COMMITTEE APPROVAL LETTER

INSTITUTIONAL ETHICAL COMMITTEE,
STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work : A descriptive study of various uses of Coblation on Pharyngolaryngology

Principal Investigator : Dr.M.Karthik

Designation : PG in M.S.(E.N.T)

Department : Department of E.N.T
Government Stanley Medical College,
Chennai-10

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 07.02.2013 at the Council Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

12/12/13

MEMBER SECRETARY,
IEC, SMC, CHENNAI

D. PATIENT INFORMATION SHEET

D. PATIENT INFORMATION SHEET

பங்கேற்பவரின் பெயர் மற்றும் விலாசம்:

ஆய்வாளரின் கையொப்பம்: **நாள்:**

ஆய்வாளரின் பெயர்: **இடம்:**

தகவல் படிவம்

தங்களுக்கு செய்த பரிசோதனைகள் மூலம் தங்களுக்கு _____நோய் உள்ளது தெரியவந்துள்ளது. இந்த நோயை குணப்படுத்த பலவகை அறுவைசிகிச்சை முறைகள் உள்ளன. அதில் உங்களுக்கு _____.

முறை பயன்படுத்தப்படவுள்ளது. இந்த அறுவை சிகிச்சையில் (coblation) பயன்படுத்தப்படவுள்ளது. மேலும் இந்த முறையின் மூலம் ஏற்படும் விளைவுளை ஒப்பிட ஆய்வு மேற்கொள்ளப்பட உள்ளது. இது குறித்த உங்களின் நோய் மற்றும் அதன் விவரங்களை ஆய்வில் பயன்படுத்த விரும்புகிறோம். தாங்கள் விரும்பினால் மருத்துவ ஆய்விலிருந்து எப்பொழுது வேண்டுமானாலும் விலகிக் கொள்ளலாம். எந்த சட்டசிக்கலுக்கும் இடமில்லாமல் எப்பொழுது வேண்டுமானாலும் தங்கள் ஆய்விலிருந்து விலகிக் கொள்ளலாம். இந்த ஆய்வின்மூலம் கிடைக்கும் தகவல்களும் பரிசோதனை முடிவுகளும் தங்களின் ஒப்புதலின்மூலம் மட்டும் ஆய்வில் பயன்படுத்தப்படும்.

ஆய்வாளரின் கையொப்பம்:

ஆய்வாளரின் பெயர்:

இடம்:

நாள்:

E. INFORMED CONSENT FORM

ஆராய்ச்சி நிலையம் : காது, மூக்கு, தொண்டை பிரிவு

ஸ்டான்லி அரசு பொது மருத்துவமனை மற்றும் மருத்துவ கல்லூரி

பங்கு பெறுபவரின் பெயர்:

பங்கு பெறுபவரின் எண் :

மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டுள்ளது. எனது நோய் மற்றும் அதன் நிலை தெரியபடுத்தப்பட்டது. எனது நோய் பற்றிய சந்தேகங்களை கேட்கவும் அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. இந்த நோயை குணப்படுத்தும் அறுவை சிகிச்சை முறைகள்_____. விளக்கப்பட்டுள்ளது. அந்த அறுவை சிகிச்சையில்(coblation) பயன்படுத்தப்படுவது பற்றி விளக்கப்பட்டது. இதை எனது அறுவை சிகிச்சையின் போது பயன்படுத்த சுயநினைவுடன் சம்மதிக்கிறேன். இந்த அறுவை சிகிச்சையின் விளைவுகளை ஆய்வில் பயன்படுத்தவும் தன்னிச்சையாக சம்மதிக்கிறேன். எக்காரணத்தினாலும் எந்தக் கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் இவ்வாய்வில் இருந்து விலகிக்கொள்ளலாம் என்றும் அறிந்து கொண்டேன்.

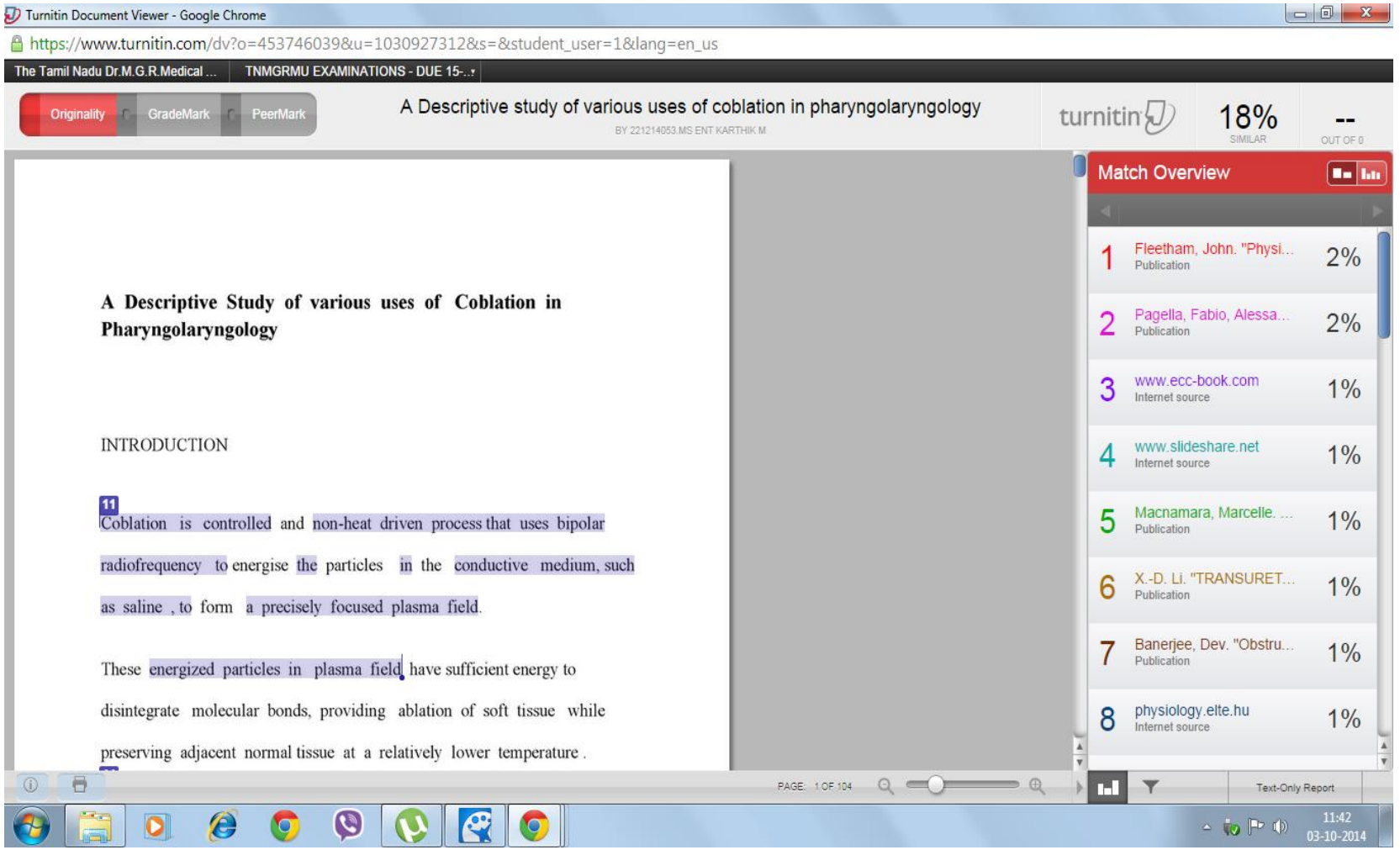
இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும் பரிசோதனை முடிவுகளையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக் கொள்ளவும் அதை பிரசுரிக்க தேவைப்பட்டால் என்னையும் எனக்கு நடக்கும் அறுவை சிகிச்சையையும் புகைப்படம் எடுக்கவும் நான் முழு மனதுடன் சம்மதிக்கிறேன்.

பங்கேற்பவரின் கையொப்பம்: நாள்:

கட்டை விரல் ஒப்பம் இடம்:

F. PLAGIARISM

F. PLAGIARISM



G. MASTER SHEET

MASTER CHART

COBLATION ASSISSTED ADENOIDECTOMY

Sl No	Age	Sex	IP number	Adenoid hypertropy	Nasal block	Aural fullness	Post OP Bleeding	Pain score	Resolution of nasal block	Recurrence
1.	11	male	156902	Grade III	Yes	Yes	No	3	Yes	No
2.	12	female	165527	Grade III	Yes	Yes	No	2	Yes	No
3.	11	male	140315	Grade III	Yes	Yes	No	3	Yes	No
4.	13	male	373341	Grade III	Yes	Yes	No	2	Yes	No
5.	11	male	179220	Grade III	Yes	Yes	No	3	Yes	No
6.	13	male	140270	Grade III	Yes	Yes	No	2	Yes	No
7	12	female	373341	Grade III	Yes	Yes	No	2	Yes	No
8	11	male	160027	Grade III	Yes	Yes	No	3	Yes	No

9	13	male	199628	Grade II	No	No	No	2	Yes	No
10	12	male	280918	Grade III	Yes	Yes	No	2	Yes	No
11	12	male	164950	Grade III	Yes	Yes	No	2	Yes	No
12	11	male	108697	Grade III	Yes	Yes	No	3	Yes	No
13	11	male	192290	Grade II	No	Yes	No	3	Yes	No
14	12	female	168747	Grade III	Yes	Yes	No	3	Yes	No
15	13	female	190172	Grade III	Yes	Yes	No	2	Yes	No
16	11	male	164783	Grade II	No	Yes	No	3	Yes	No
17	12	male	132992	Grade III	Yes	Yes	No	2	Yes	No
18	12	male	742301	Grade III	Yes	Yes	No	2	Yes	No
19	11	male	167663	Grade III	Yes	Yes	No	3	Yes	No
20	13	female	161593	Grade III	Yes	Yes	No	2	Yes	No

COBLATION ASSISSTED TONSILLECTOMY

Sl No	Age	Sex	IP number	Tonsillar hypertropy	Sore throat	Difficulty in Swallowing	Post OP Bleeding	Pain score	Return to Normal diet (day)	Time Taken (min)
1.	14	Male	142970	Grade III	Yes	Yes	No	3	4	18
2.	15	Female	101699	Grade III	Yes	Yes	No	2	3	22
3.	11	Male	140393	Grade III	Yes	Yes	No	3	3	19
4.	16	Male	307861	Grade III	Yes	Yes	No	2	3	23
5.	11	Male	307932	Grade III	Yes	Yes	No	3	3	20
6.	13	Male	307881	Grade III	Yes	Yes	No	2	3	18
7	12	Male	186337	Grade III	Yes	Yes	No	2	3	20
8	11	Male	307908	Grade III	Yes	Yes	No	3	4	22
9	15	Male	168633	Grade II	No	No	No	2	3	29

10	12	Female	307877	Grade III	Yes	Yes	No	2	4	18
11	12	Male	117753	Grade III	Yes	Yes	No	2	3	24
12	16	Male	230217	Grade III	Yes	Yes	No	3	3	22
13	11	Male	134062	Grade II	No	Yes	No	3	4	24
14	17	Female	1403170	Grade III	Yes	Yes	No	3	3	19
15	13	Male	221380	Grade III	Yes	Yes	No	2	3	25
16	17	Male	161721	Grade II	No	Yes	No	3	3	30
17	12	Male	183941	Grade III	Yes	Yes	No	2	3	23
18	12	Male	198447	Grade III	Yes	Yes	No	2	3	18
19	11	Male	157930	Grade III	Yes	Yes	No	3	4	23
20	13	Female	148103	Grade III	Yes	Yes	No	2	3	24

COBLATION ASSISTED UVULOPALATOPLASTY

Sl No	Age	Sex	IP Number	Tonsillar hypertropy	Snoring	Difficulty in Swallowing	Post op Snoring	Pain score	Return to Normal diet (day)	scarring	ESS Score (Pre OP)	ESS Score (Post OP)
1.	34	Male	962120	Grade I	Yes	Yes	Absent	3	4	No	18	6
2.	32	Female	396186	Grade II	Yes	Yes	Absent	2	5	No	19	7
3.	45	Male	178729	Grade III	Yes	Yes	Absent	3	5	No	18	6
4.	28	Male	308120	Grade I	Yes	Yes	Absent	4	6	No	24	7
5.	40	Female	205551	Grade I	Yes	Yes	Absent	3	3	No	21	6

COBLATION ASSISSTED EXCISION OF BENIGN LARNYGEAL LESION

Sl No	Age	Sex	IP Number	Change of voice	VLS	stridor	Tracheostomy needed	Pain score	Voice improvement	Recurrence
1.	33	Male	141436	present	Larngeal Papilloma	Absent	No	3	Present	No
2.	40	female	242361	Present	Ventricular cyst	Present	Yes	2	Present	No
3.	42	male	280558	Present	Larngeal Papilloma	Present	Yes	3	Present	No
4.	16	male	243201	Present	Larngeal Papilloma	Absent	No	5	Present	No
5.	28	male	196502	Present	Ventricular cyst	Absent	No	3	Present	No

6.	33	female	177376	Present	Larngeal Papilloma	Absent	No	5	Present	yes
7	41	male	5228443	Present	Ventricular cyst	Absent	No	4	Present	No
8	45	female	229905	Present	Ventricular cyst	Absent	No	3	Present	No
9	28	male	250892	Present	Valleculacyst	Absent	No	5	Present	No
10	29	female	155001	Present	Larngeal Papilloma	Present	Yes	4	Present	No
11	18	male	205840	Present	Ventricular cyst	Absent	No	2	Present	No
12	36	male	144198	Present	Valleculacyst	Absent	No	3	Present	No
13	19	male	312116	Present	Larngeal Papilloma	Absent	No	4	Present	yes

14	17	female	464421	present	Larngeal Papilloma	Absent	No	3	Present	No
15	28	male	997212	Present	Ventricular cyst	Absent	No	5	Present	No
16	17	male	731091	Present	Larngeal Papilloma	Absent	No	3	Present	No
17	29	female	159073	Present	Vallecular cyst	Absent	No	4	Present	No
18	33	male	170482	Present	Larngeal Papilloma	Absent	No	2	Present	No
19	39	male	724081	Present	Ventricular cyst	Absent	No	4	Present	No
20	44	female	315730	present	Larngeal Papilloma	Present	Yes	5	Present	No